MIDWEST MARKETING ISSUE
Pages 9-16

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A WEEKLY NEWSPAPER FOR THE FARM CHEMICAL MANUFACTURER, FORMULATOR AND DEALER

Published by The Miller Publishing Co., Minneapolis, Minn.

Vol. 4 | Accepted as Controlled Circulation Publication at Minneapolis, Minn. | JULY 22, 1957 | Subscription Rates: $5 for 1 year, $9 for 2 years | No. 29

California Hopper Invasion Spreads To New Counties

Extensive Control Operations Under Way As Infestation Spreads

— More Insect Notes on Page 4 —

SAN FRANCISCO—Three more California counties have been invaded by grasshoppers as most of the agricultural industry in the state continued on the alert against spreading damage.

Airplanes were in the skies over Contra Costa County, as the county board of supervisors made a special grant of $8,000 to Arthur Seeley, agricultural commissioner, to supply farmers with insecticides. Mr. Seeley proposed that the county buy the chemicals and that the farmers share the cost of the aircraft to lay down a half-mile wide swath for some 60 miles around the foothills where the grasshoppers were being hatched in swarms.

In Sacramento County a horde of the insects began devouring fruits, vegetables, range grasses and others in the "worst infestation in 20 years," according to Fred Platt, county agricultural commissioner of Butte County. Damage already exceeds one million dollars, he estimated. Spray planes were flying fast and low—one covering some 19,000 acres in a single day—but the grasshoppers were multiplying even faster, he said.

In Santa Clara County another "worst infestation" invaded orchard

(Continued on page 8)

Revision Program Under Way at IMC Carlsbad Facilities

CHICAGO—Work has begun on a construction and revision program which will add over half a million dollars to the investment of International Minerals & Chemical Corp. in its Carlsbad, N.M., plant.

When the new installations are completed, the company will be in a position to size its entire production of muriate of potash. "The project is designed to permit International to keep pace with the increasing demand for its granular muriate product, as well as providing control of the size of its regular muriate," the firm stated.

Fines will be removed from the production and will be used as feed for the chemical plant, where potassium sulfate and pure grade of potassium chloride are produced. Largest item in the program is the installation of screens at the delivery end of the dryers, together with conveyors and elevators incidental to this installation. All muriate production will feed from the dryers through the screens and will be sized. Several other revisions and additions to the plant will be made at the same time.

Additional loading facilities will be installed in the No. 2 warehouse and the present bagging plant will be revised and improved to handle increased tonnages of bagged shipments. Tying into the program will be revisions to the dryers to increase their capacity and minor changes in the crushing plant. Construction and installation work are being handled by Stearns-Roger Manufacturing Co., with completion planned for September, this year.

Healthy Pastures Vital to Good Farming, Eastern Canada Plant Food Producers Told

MURRAY BAY, QUEBEC—The importance of high producing grasslands in modern farming was emphasized at the annual convention of the Plant Food Producers of Eastern Canada, held at Manior Richelieu here July 10-14.

N. J. Thomas, associate professor, department of soils, Ontario Agricultural College, reported to the 250 attending members and guests on the seventh International Grasslands Congress which he attended last November in New Zealand. He pointed out the emphasis placed on grasslands in New Zealand and other countries around the world.

"New Zealand derives 96% of its income from exports—animal and dairy products derived solely from crops of grass and clover, without supplements of grains or concentrates," Mr. Thomas said. "Because of this, New Zealand encourages closest cooperation between farmer and scientist in studying new ways of keeping grasslands in high production.

"Their fertility program is based chiefly on lime, phosphates and trace elements, with potash becoming increasingly important. Approximately 10 million acres were top dressed in 1956 and of the more than one million tons of fertilizer used, nearly one half was applied by airplane."

In relating the importance of grasslands to farming in Canada, Mr. Thomas pointed out that, in 1955, 54% of the total production of milk

(Continued on page 21)

Inside You'll Find

Insect, Plant Disease Notes	4
Field Notes	8
Over the Counter	9
Farm Service Data	17
What's New	18
Editorials	22
Meeting Memos	23
Index of Advertisers	23

Pasture Land Forms Cornerstone of New Conservation Concept

By JOHN CIPPERLY
Croplife Washington Correspondent

WASHINGTON—As the soil bank legislation now stands—and including the old Agricultural Conservation Program—there will be available for retirement of acreage from field crop production this year about one billion dollars.

That is now seen as a long range project on an annual basis for 10 years to bring into effect the goals of Ezra Taft Benson, secretary of agriculture.

It involves a program which would mean the retirement of whole farms and the pooling of farm acreage in many areas of the nation in consequential amounts. As now seen it would amount to approximately 50 million acres of land now in field crop cultivation. Pasture land would be the cornerstone of this long term 10-year concept. An index of how rapidly these architects of the conservation side of the Benson goals would work may be found in their hopes for the Conservation Reserve Program. They expect that the program will be expanded in 1958 by 10 million acres bringing that phase of the soil bank up to about 17 million acres. That is about one third of the acreage reduction which soil bank officials now see as an appropriate goal for field crop land in cultivation.

This present soil bank program, which up to this time has deflated the Conservation Reserve Program in favor of Acreage Reserve Program, is now being seen as a continuing project. The old Agricultural Conservation Program would be incorporated and geared to a new concept for agriculture in the Great Plains States

(Continued on page 20)

SPECIAL PASTURE ISSUE

This is the second of four special emphasis issues of Croplife on the fertilization and maintenance of pasture and range lands. Material in this issue discusses the pasture situation relative to Midwest states. Special material for southern states appeared in the July 15 issue of Croplife, and issues devoted to the West and Northeast states will follow.

New Indiana Firm Announces Plans To Construct Plant

PORTLAND, IND.—Green Belt Chemical Co., a new firm, has announced that it is about to start construction of an agricultural chemical and plant food plant and warehouse near here.

Contracts have been let for the equipment and building, which will be 222 ft. by 130 ft. The plant will be of wood and steel construction. Green Belt Chemical is capitalized at $250,000.

Nematode Hearing to Include Mississippi

WASHINGTON—A proposal to include the state of Mississippi in quarantine action because of the recent finding there of the soybean cyst nematode will be considered at a public hearing July 24, along with previously announced similar proposals to quarantine the states of Arkansas and Kentucky.

The expanded hearing will be held in the Panorama Room of the King Cotton Hotel, Jefferson at Front Street, Memphis, at 10 a.m., July 24, the U.S. Department of Agriculture announced. The newly reported infestation in Mississippi is limited to a single farm in De Soto County, in the northwestern corner of the state.

Atlas Powder to Spend $4 Million On Missouri Plant

WILMINGTON, DEL.—Atlas Powder Company will replace the nitric acid and ammonium nitrate facilities at its Atlas (Mo.) plant during the next nine months at a total cost of approximately $4,000,000, Ralph K. Gottshall, Atlas president, has announced.

Work on installing the new, modern units is beginning immediately, and they are expected to be in operation by March 1, 1958.

Commenting on the announcement, D. J. Carroll Copps, senior vice president in charge of the company's explosives division, said: "We have been hard-pressed for some time to produce enough nitric acid and ammonium nitrate to meet our internal company needs. These new units not only will enable us to meet our own immediate needs more efficiently, but also will provide additional capacity that will permit us to offer some of our products for sale to industrial consumers."

The new acid plant will be one of the so-called "self-sustaining" types and the first of its kind to be erected in this country, according to the contractor. Once the plant is started up, the energy released from the burning of ammonia is recovered to the extent that it provides the full power requirements of the unit when operating under design conditions.

The Chemical and Industrial Corp., Cincinnati, has been granted the contract for the design and contruction of the acid unit.

TO PROMOTE FERTILIZER INFORMATION

Arthur A. Schultz Heads New Pennsylvania Plant Food Group

UNIVERSITY PARK, PA.—The Pennsylvania Plant Food Educational Society, Inc. was organized July 11 during the state fertilizer and lime conference held at Pennsylvania State University here.

The new organization is a non-profit corporation, designed to "foster and promote useful and practical information regarding all forms of plant food, soil amendments and their use on crops, better cultural practices and related information."

Officers of the group are Arthur A. Schultz, president of Reading Bone Fertilizer Co., Reading, president; Howard B. Sprague, head of the Department of Agronomy at Penn State, vice president; and Roger C. Smith, Eastern States Farmers' Exchange, West Springfield, Mass, secretary-treasurer.

Directors elected to serve until January, 1958 are Mr. Smith, Sam S. Thornton, Royster Guano Co., Baltimore; David Shroyer, H. E. Millard Lime and Stone Co., Annville; Leland H. Bull, deputy secretary of agriculture in Pennsylvania; Clarence A. Reichard, Robert A. Reichard, Inc., Allentown, and E. T. York, American Potash Institute, Washington, D.C.

Directors serving until January, 1959 are Mr. Schultz; Mr. Sprague; Herbert R. Albrecht, director of agricultural and home economics extension in the state; Perry Onstot, Davison Chemical Co. division of W. R. Grace & Co., Baltimore; and George H. Serviss, G.L.F. Soil Building Service, Ithaca, N.Y.

Conference speaker, M. S. Williams, chief economist for the National Plant Food Institute, discussed returns and profits from lime and fertilizers. He said the advantage of developments such as hybrid corn lies in their ability to respond to higher levels of plant food. At low fertility levels, hybrid corn is no better than old varieties, he stated.

"The farmer will make more net profit by growing a given amount of corn on less acreage with adequate fertility," Mr. Williams declared. "The increased use of fertilizer contributes to efficiency of production by lowering per unit costs and increasing profit per unit and per acre."

He said the farmer will realize highest returns from plant food only when his fertility program is fitted in with other improved practices in a sound mangement program for the whole farm. The combination of plant food and improved practices means the most farm profits, he added.

"I'm convinced that if the farmer understands and applies a few simple principles he can make better use of plant food," Mr. Williams asserted. "If he applies these principles, he will increase his returns and profits. Then he will be a more efficient and prosperous farmer and we have a better customer."

The National Plant Food Institute speaker reminded salesmen and manufacturers that a soil test is the best way for a farmer to find out how much fertilizer to use. Soil tests help the farmer fit college recommendations to his own situation, he pointed out.

Need for completion of a soil mapping program of Pennsylvania was stressed by Dr. Sprague of Penn State. Around 130 million dollars are spent annually in the state for feed and only 31 million dollars for fertilizer, he estimated.

This unbalanced condition should be corrected, in Dr. Sprague's opinion, by the purchase and use of more fertilizer. This would in turn result in greater production of feed. Soil maps are needed, he said, to determine in general where the additional fertilizer is most needed.

The new Plant Food Educational Society made plans for a series of conferences to be held at Penn State in August and September. The conferences will make recommendations for the 1958 agronomy guide issued annually by the Agricultural Extension Service and Experiment Station. Planning includes advice and assistance from lime, fertilizer and seed industries and federal agencies.

Velsicol Chemical Adds Gibberellin To Line of Products

CHICAGO — Velsicol Chemical Corp. has added gibberellin, the plant growth stimulant, to its line of agricultural chemicals, according to an announcement by J. F. Kirk, vice president of the firm.

Velsicol gibberellins now are available in commercial quantities and will be sold to formulators for conversion into packaged products for agricultural and home use, Mr. Kirk said. The firm is cooperating with federal and state experiment stations in the economic evaluation of gibberellin-induced response on major crops.

Clover Root Borer Appears in Virginia

BLACKSBURG, VA.—A. M. Woodside and E. C. Turner, Jr., of the Virginia Polytechnic Institute Agricultural Experiment Station's entomology staff, say recent investigations have shown that heavy infestations of the clover root borer are common in the northern part of Virginia.

Control of the clover root borer, accompanied by increases of as much as 1,500 lb. of cured hay per acre and greater survival of clover plants, has been obtained in station tests by applying insecticides on the surface of the soil, the researchers say.

DELAWARE FIELD DAY

NEWARK, DEL.—The annual farm field day at the Georgetown substation division of the University of Delaware School of Agriculture will be held Aug. 14. Experiments and demonstrations that will be highlighted on program include use of chemicals to control weeds in tomatoes, asparagus and strawberries; testing of fungicides to control disease on late-planted potatoes and to control crown rot of cantaloupes; rotational practices to control root-knot nematodes; soybean fertilization; chemical weed control on soybeans; use of green manures to determine the influence of nitrogen and cover crops on corn yields; and insect control.

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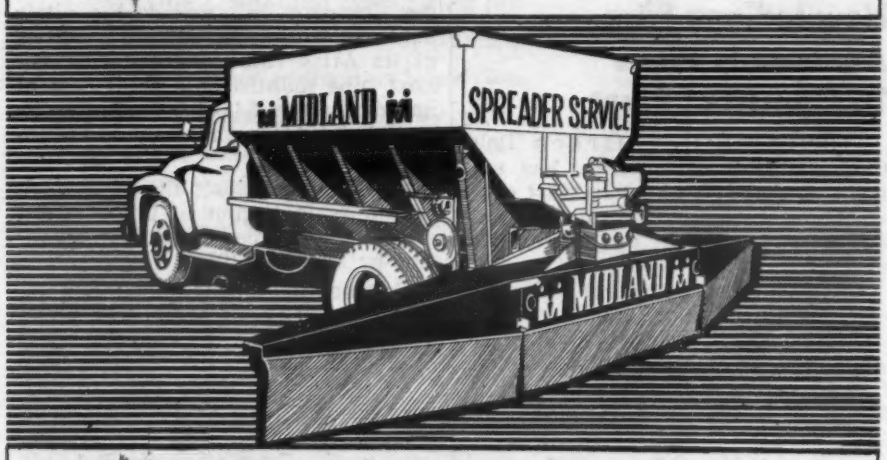

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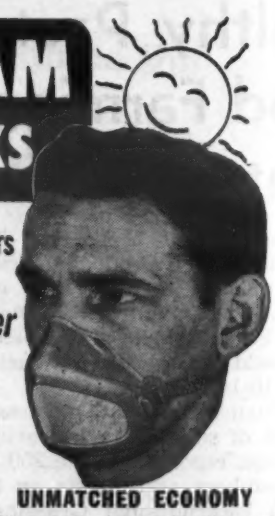

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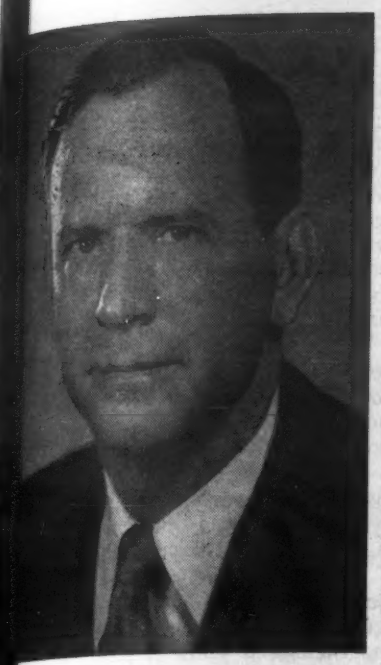


John L. Tullis

hn L. Tullis Named New Beaird Post

SHREVEPORT, LA.—John L. Tul- vice president of sales, has been vanced to vice president and assist- t general manager of the J. B. aird Co., Inc., J. Pat Beaird, presi- nt, has announced.

Mr. Tullis, who has been associated th Beaird for 10 years, was elected director of the company in Febru- y of this year, when five officials American Machine & Foundry Co. re named to the board following e affiliation of Beaird as a member mpany of AMF. In his new capa- y, Mr. Tullis will have executive sponsibility for all phases of Beaird erations.

Joining the Beaird sales organiza- n in March, 1947, Mr. Tullis was neral sales manager for several ars before his elevation to vice esident and general manager of sales April, 1954.

ack of Funds Hurts orest Insect Control Work, Committee Says

ALBUQUERQUE, N.M.—A lack of search funds is hampering the U.S. orest Service's campaign against ree important insect pests in New exico and Arizona Forests.

The Southwestern Forest Pest tudy and Action Committee, a pri- te group of lumbermen and other terested individuals, recommends at the entomologists of the Rocky ountain Forest Range Experiment tation here be given $50,000—in- ead of the present $10,000 a year— study techniques to combat the uthwestern pine beetle, the Great asin tent caterpillar and the fir en- aver beetle.

The pine beetle, says Dr. Calvin assey and his fellow Forest Service ntomologists, killed 195 million oard feet of commercial timber in rizona and New Mexico in 1955, d a considerably larger amount in 56. The tent caterpillar is a threat recreation areas. It defoliates the ees.

The engraver beetle has been at- cking the white fir trees in the ndia Mountains next to Albuquer- e since 1949 and has been actual- causing the trees to die since 1953. bout 35% of these trees are now ead, says the Forest Service. Rela- ely nothing can be done to save e rest of the stand because of lack funds, the committee says.

FRUIT MOTH FUMIGATION

SALEM, ORE.—The Oregon De- rtment of Agriculture has been in- rmed that British Columbia is like- to require fumigation for the riental fruit moth. Canadian pro- osals will require fumigation in a as-tight vault, chamber, refrigera- r, railway car or motor car.

Cooperative Promotion Program Makes Good Progress in Nebraska

LINCOLN, NEB.—A cooperative program for promoting mixed dry fertilizers in Nebraska is making good progress, it is reported by Howard W. Elm, executive secretary of the Nebraska Fertilizers Institute, Inc.

About a year ago a group of independent fertilizer manufacturers in Nebraska arrived at a decision that in order to retain their business it would be necessary for them to promote dry mixed materials.

To do this with maximum impact and minimum cost, the group decided to establish a trade mark and promote that name cooperatively. The name Chemix was registered. Members of the Nebraska Fertilizer Institute, which was formed to do this work, are permitted to use the Chemix name only by written contract with the institute. This contract is specific as to how Chemix can be manufactured and sold. The manufacturer then pays a tonnage fee which is used in an educational and promotional program.

Six grades of Chemix are made to tie in with recommendations of the University of Nebraska, 15-15-0, 5-20-20, 10-20-0, 10-20-10, 12-12-12 and 8-32-0. Promotional work of the institute is centered on these grades.

The institute has promoted "Chemix Grow-Power Fertilizer" in farm papers, on radio and television stations. Brochures have also been put out along with window stickers.

Mr. Elm reports that the manufacturers are enthusiastic about the program and quite satisfied with accomplishments to date.

"The program has had a tremendous impact on the farmer," Mr. Elm said. "Instead of talking dry, mixed fertilizer, the manufacturers, their salesmen, their retailers and the farmer have shortened this to the one word, Chemix."

Westvaco Transfers Research Activities

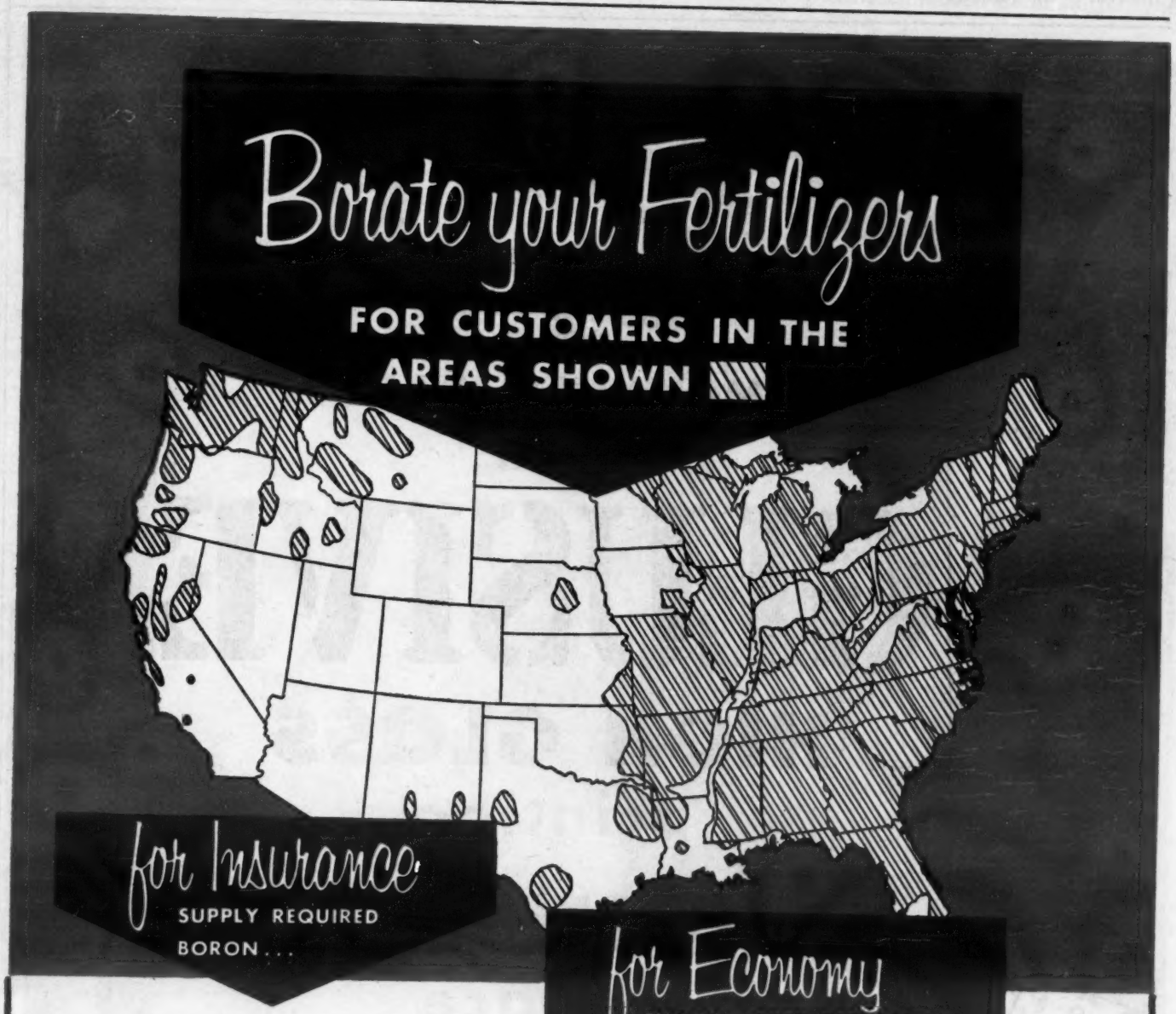
POCATELLO, IDAHO — Westvaco Mineral Products Division has transferred its research section from Newark, Cal., to Pocatello, Idaho. The new department, headed by Dr. Kenneth C. Vincent, will be integrated with the mineral development, which is under the direction of Ott Power.

Accompanying Dr. Vincent from his California laboratories are George W. Martin and Joseph D. Lewis. They will join Robert Baker, who has been a chemist for several years in the Westvaco plant in Pocatello.

Westvaco is a producer of mineral fertilizers in the Intermountain area, and holds leases on phosphate lands in southern Idaho.

NEW DISTRIBUTOR

CINCINNATI — William S. Stein Seed Co. is a new distributor here of seeds, fertilizers, insecticides and related products.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INSECT AND PLANT DISEASE NOTES

Cutworms Plentiful in Missouri Late Corn

COLUMBIA, MO.—(July 13)—It's both late and hot for cutworms, but we seem to have a lot of them, particularly in late corn. Seedling stands, as well as corn that's as much as 24 to 30 inches tall, are being injured. At the present time, we have thousands of acres of late corn that are being damaged by cutworms. In many fields, from 10 to 50% of the stand is being taken out. Control now is hard to get, but if the worms are not stopped, it's too late to replant.

Over the northern half of state there's been no particular change in the leafhopper situation. Nearly every alfalfa field is showing hopper yellowing, and there is every reason to believe this will continue through most of the rest of the summer.

Over most of the southern half of state, leafhopper counts are down considerably.

Numerous fields of corn in the south central and southwest areas of the state show evidence of varying degrees of fall armyworm damage. These worms are working down in the whorls and the resulting damage resembles that of the corn earworm. —Stirling Kyd and G. W. Thomas.

Insect Population Builds Up in Maryland

COLLEGE PARK, MD.—Potato leafhoppers are present in alfalfa fields from Prince George's County to Garrett, 1 to 13 per sweep, and yellow injury is showing. Tarnished plant bugs are common on all plants. These insects are blossom feeders and damage seed crops.

Sweet corn planted by May 10 (now silking) has 11% European corn borer in Queen Anne's County (9 fields) and 29% in Frederick County (7 fields). No increase apparent and the borer populations of late fields very light. Small numbers of corn earworm eggs appearing on silks. Sap beetles numerous. Japanese beetles noted on corn in Queen Anne's County.

Spider mites are heavy in some soybean fields in Wicomico County. Other insects doing some damage—thrips, Japanese beetle, and leaf beetle.—Theo. L. Bissell and W. L. Harding.

Corn Pests at Work in Illinois Crops

URBANA, ILL.—Corn borer pupation has started in early-market sweet corn in the East St. Louis area. Some moths will be flying within two weeks, and egg masses will appear sometime after July 20. Any market-garden sweet corn that is 10 or more days' from harvest when second-generation eggs first begin hatching should be treated. Pupation is beginning in field corn, in central a southwestern Illinois and egg-layi will begin about August 1.

Some grasshoppers are feeding marginal rows of corn and soybea but most of them are concentrated fencerows, roadsides, grass wate ways and ditch banks. If foliage comes scarce in these places, th will migrate to adjacent crops. Gra hoppers are also abundant in so hay fields, especially in the northe half of Illinois.

Many alfalfa fields are heavily i fested with leafhoppers and much y lowing and stunting of growth ha occurred in some areas of central a southern Illinois.

Another generation of black cu worms may appear within the ne week or two, and this insect can dam age fairly good-sized corn.

There have been a few scattered i festations of chinch bugs in sma grains, particularly in eastern a northeastern Illinois, and migrati to corn has begun.

In northern Illinois this past wee true armyworms damaged a few fiel of corn. In central and southern Il nois, fall armyworms are leaving t corn plants to pupate in the soil, a in most cases control measures a no longer of any value. — Ste Moore.

Alabama Feels Bite of European Corn Borer

AUBURN, ALA.—A severe attac by European corn borers was note in North Alabama this week, wit recent heavy rains favoring the i crease of the pests. Walter Grime Alabama extension pest control sp cialist, said that corn in the souther portion of the state is getting t mature for the corn earworm, wit the result this pest is moving into co tonfields.

The corn borer has been found i only fifteen north Alabama countie so far, but entomologists have warne "nothing stands in the way of it southward march through the state.

Weevils and Worms Threaten Cotton Stands

CLEMSON, S.C.—Cotton farmer of South Carolina continue to b faced with threats of severe damag to their crops from insects. Boll wee vil population is increasing, bollworm eggs and larvae are reported presen in increasing numbers in severa counties, and spider mites and aphid are also reported to be present i many fields.

While overwintered weevils hav apparently all emerged, new weevil of the first generation are appearin in increasing numbers in practicall all parts of the state. Weather condi tions have continued to hinder grow ers in their efforts to control weevils

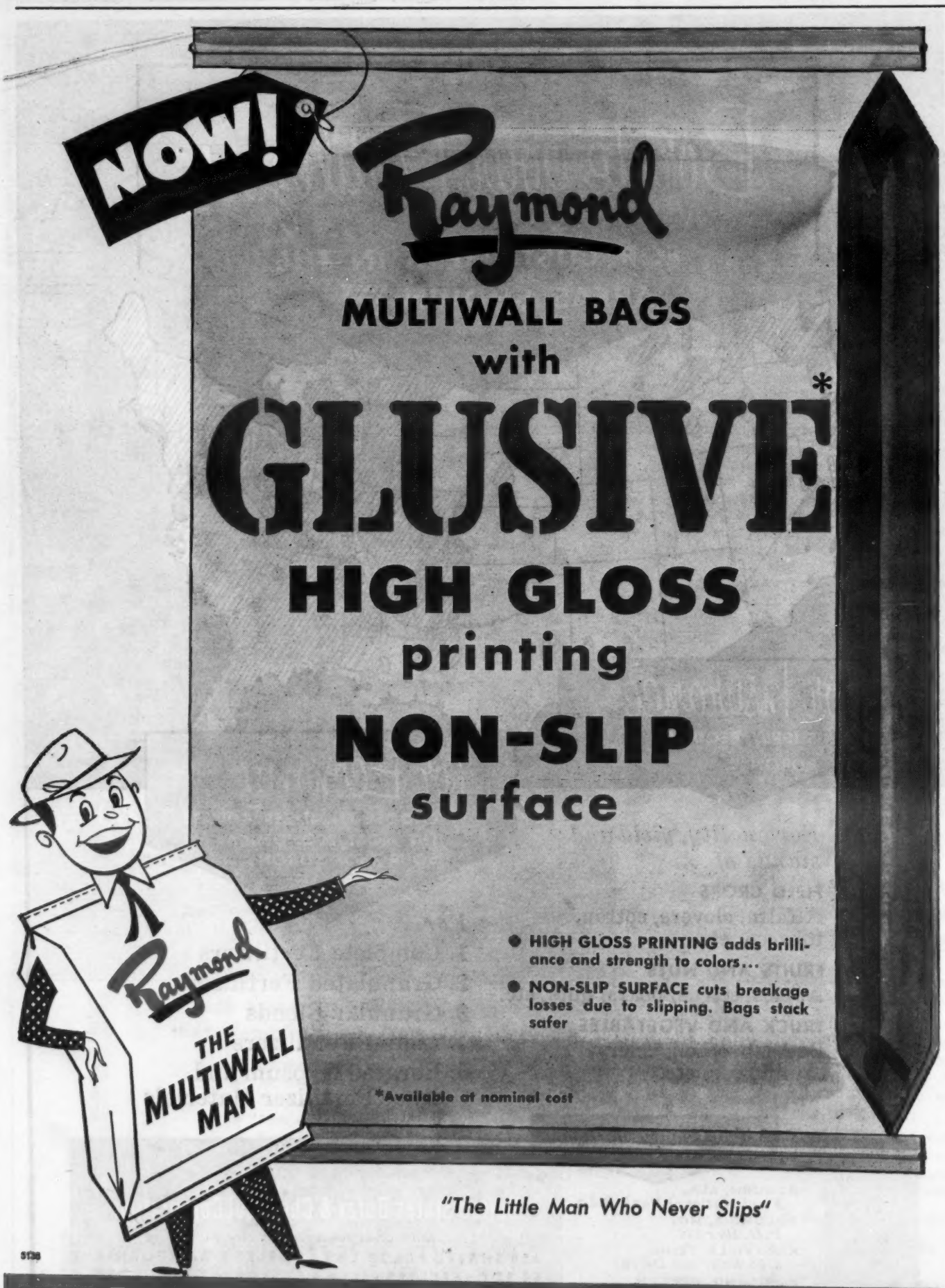
A rather serious and widesprea outbreak of bollworms threatens. Thi is shown by bollworm eggs and larva being found in many cotton fields The threat of damage by aphids an spider mites is not as serious as th threat of boll weevil and bollworm damage.

The Clemson extension cotton com mittee points out that growers ar likely to have to continue application of insecticides later in the season thi year than usual and that they shoul make arrangements now to obtai the necessary materials to continu these applications.

Cotton, Other Crops Attacked in Texas

REFUGIO, TEXAS—Insect build up in this area has increased rapidly according to D. F. Breedlove, county agent. Farmers have become dis couraged because inclement weathe has wasted much of the insecticide they have applied.

Fleahoppers have constantly at tacked cotton, and now leaf worms and boll worms are a serious threat With a week of clear weather, farm ers are now able to get into the field and use their spray equipment. Some



e operating day and night to hold e insects in check.

Reports from many other parts of exas show insects are on the in-ease. In West Texas there are oradic infestations of lygus bugs, bbage loopers, thrips, fleahoppers d boll worms.

In some parts where range and cul-vated land lie adjacent, grasshop-rs are becoming a serious threat to ung cotton. Since the grasshoppers e not easily killed by aerial spray-g, farmers are using various types baits.

otton Attacked by wo Pests in Georgia

ATHENS, GA.—A total of 55 fields 23 counties was checked with a nge of 5-80% infestation of boll eevil and an average of 35% punc-ured squares. All fields examined ere infested.

Heavy infestations of bollworm in rady, Thomas and Colquitt coun-es. Six bollworm eggs per 100 termi-al buds in Jenkins County and 9 ollworm eggs per 100 terminals in arren County.

Light infestations of aphids on cot-n in Mitchell, Miller, Appling, Jen-ns and Oconee counties. Moderate festations in Turner, Worth, Col-itt, Bacon, Tattnall, Evans and arren counties. Heavy infestations Twiggs, Pulaski, Wilcox, Seminole, rady, Thomas, Cook, Coffee and urke counties. All 55 fields infested ith aphids.

Spider mites—light to moderate in-estations of spider mites in all fields. -W. C. Johnson.

oll Weevils Active in arts of Tennessee

KNOXVILLE, TENN. — Boll wee-ls are causing considerable damage the southern counties with some ght spotted damage up as far as uderdale County. The heaviest in-stations are south of Jackson, Ten-essee, with the severest infestations eing below Highway 57. A few first eneration weevils are emerging at is time (July 15) but the peak of mergence should come by the end of ext week. This week's square count verage was 18% and was 31% at is time last week. The square count verage was 28% at this time last ear. The average per cent of punc-ured squares for the heavier infested outhern counties was 21%. There as been a drop in per cent of punc-ured squares since last week. This is robably due to the falling of infested uares from the overwintered wee-ls.—R. P. Mullett.

eavy Rains Reduce rasshopper Numbers

ST. PAUL, MINN.—Recent heavy ins have helped reduce grasshopper mbers around Minnesota, accord-g to A. W. Buzicky, associate state tomologist, and L. K. Cutkomp, en-mologist at the University of Min-esota. They report that rains during e hatching season killed a large mber of the two-striped hoppers at commonly hatch along roads and ighways. As a result, these hoppers ill not be as much of a problem in any areas as they have been in some revious years.

The rains had no effect on red-leg-d grasshoppers in hay fields, how-ver. These hoppers have just started hatch and can be expected to be t in large numbers in many areas the state after first hay cutting is mpleted.

orers Getting Under ay in Iowa Corn

AMES, IOWA—First pupation of rn borer occurred at Ankeny July . This is the earliest in the 9 years detailed records. On July 10, 11, d 12 new egg masses laid by first od moths were seen in Polk, Story, one and Monona counties.

Larvae in Boone County grew 2 in-ars in 7 days! There is some infesta-tion of first brood borers in grain sorghum. Second brood borers will be much more serious in sorghum. Smartweed has good infestation of larvae.

Second brood borer will be hard to control. There is a lot of late corn to infest and moths will be emerging from July 22 until Sept. 1. In tests conducted to date, granules have given as good control as sprays against second brood borers.

Armyworms are moving from oats to corn in Boone County and Marion County. They range from ¾ to 1¼ inches long.

Corn earworm and common stalk borers are present in whorls and upper stalks of corn in most counties. Infestation is light, worms are large. No control suggested.

Chinch bugs are showing up. In some counties adults laid eggs in small corn (Ringgold). In others (Mills and Taylor) nymphs are migrating from wheat to corn. In Wayne County they are moving from sudan to grain sorghum.

Grasshoppers range from 2 very small hoppers per square yard in hay fields, gardens and fencerows in northern Iowa to 25 per square yard (half grown to adult) in southern Iowa.—Harold Gunderson.

Lygus Bugs, Fleahoppers Loom Large in Arizona

PHOENIX, ARIZ.—Lygus bugs and fleahoppers are the most troublesome insects in the cotton picture. They are present in many fields of Cochise county, and in Graham county east of Safford and in the Thatcher area.

In Maricopa county, lygus counts were heaviest in the Chandler area. Bollworms and bollworm eggs are showing up in most areas, but control chemicals are not warranted as yet.—J. N. Roney.

Fire Ant Continues Northward Journey

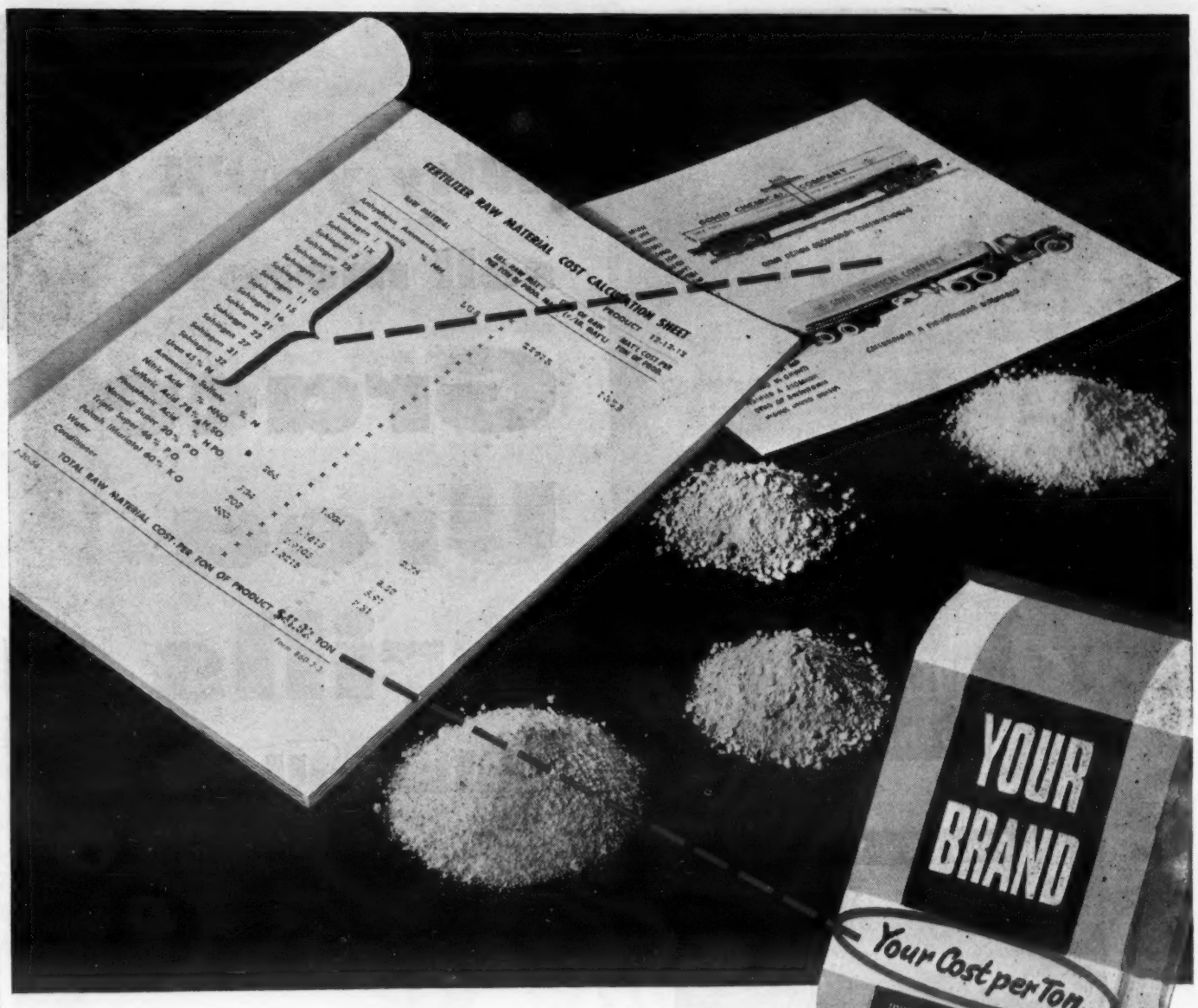
LUBBOCK, TEXAS—The imported fire ant is gradually working his way north and west, according to H. R. Prickett, Lubbock, sub-area leader for the division of plant pest control, USDA.

He reports that the ant is now usually found more than 200 miles from the coast and infestations occur throughout Mississippi, Arkansas and Tennessee. The pest now infests more than 20,000 acres in five Gulf Coast counties of Texas. An appeal has been made for federal aid to bring the insects under control.

Spotted Alfalfa Aphids Build Up in California

SACRAMENTO, CAL. — Temperatures generally over the 100-degree mark have caused a rapid buildup of spotted alfalfa aphid infestations in Sacramento Valley counties. Reported in the Valley for the first time last July, the aphids overwintered and are now posing a real menace, according to county agricultural commissioners and farm advisers.

Some natural predators are present, principally lacewings, but there has been a decrease in ladybird beetles.



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Minnesota Says to Apply Nitrogen on Pastures in Fall

Minnesota fall pasture fertility recommendations have been given as follows by the agricultural extension service of the Institute of Agriculture, University of Minnesota, St. Paul. It states that fertilizer recommendations for phosphorus and potash are based on the Minnesota soil test. Unless erosion is a problem both nutrients can be applied in the fall which is probably the best time inasmuch as many permanent grass pastures are quite wet in the spring.

Nitrogen recommendations are also based on the soil test but because the organic matter content of a soil is a less reliable indication of available nitrogen, other soil factors are taken into account in making nitrogen recommendations. Of these, the drainage of the soil and past manure applications are most important. Generally poorly-drained soils need more nitrogen than a well-drained soil of the same organic matter content.

In the northern half of Minnesota the grazing periods can be extended by splitting the nitrogen application, applying half of the nitrogen in the fall or early spring and half in July. In southern Minnesota there is generally no advantage in splitting the nitrogen application because high temperature and lack of moisture prevent the growth of grasses.

Fall applications of nitrogen is recommended on all soils if applied just before freeze up. Some nitrogen loss may occur on very sandy soils if applied too early in the fall.

The following is a guide to fertilizer use for permanent grass pastures in Minnesota:

As in the case of grass pastures, fertilizer recommendations are based on soil tests. In order to minimize the risk of bloat nitrogen can be applied to stimulate the grass in the mixture. Fertilizer is broadcast annually as a topdress and can be applied at any time during the year. Fall applications are desirable in that the farm work load is probably less than in the spring and field conditions are drier. It is however less important to get fertilizer on grass legume mixtures early in the spring than it is for straight grass pastures.

Recent work at Minnesota has shown that in the northern part of the state at least, nitrogen fertilization of grass pastures together with good pasture grazing mangement may be the most profitable system of pasture management. Cow days of grazing have been increased 2 to 3 times by applications of 200 lb. nitrogen an acre.

The importance of hay and pasture lands in Minnesota is indicated in a recent statement by Frank Hady, USDA economist and S. A. Engene, agricultural economist at the University of Minnesota, who say that a third of all farm land in the state is in hay and pasture.

TABLE 1. Guide to Fertilizer Use for Perma... Grass Pastures

Soil texture group	Soil test	Nitrogen pounds of plant food t... apply per acre	Phosphate pounds of plant food t... apply per acre	Pot...
Group 1— Loams and finer	High	30	20	
	Medium	60	40	
	Low	100	60	
Group 2— Sandy loams and coarser	High	30	20	
	Medium	50	40	
	Low	80	60	

TABLE 2. Guide to Fertilizer Use for Topdr... ing Established Stands of Legumes or Legu... Grass Mixtures

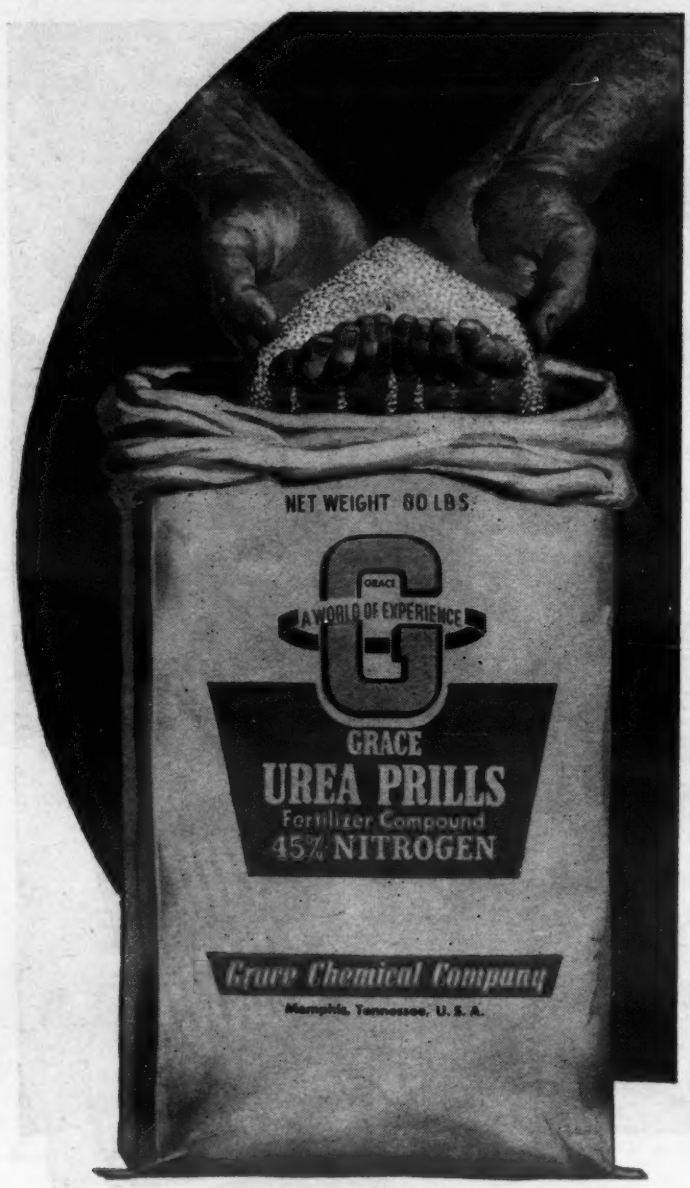
Soil texture group	Soil test	Nitrogen pounds of plant food t... apply per acre	Phosphate pounds of plant food t... apply per acre	Pot...
Group 1— Loams and finer	High	..	..	
	Medium	20	40	
	Low	50	60	
Group 2— Sandy loams and coarser	High	..	..	
	Medium	30	30	
	Low	60	50	

These areas cover 11 million ac... in the state, they point out. Th... information is based on the U... Census of Agriculture for 1950.

Proportion of hay and pastur... varies widely from one section of th... state to another. In northeaster... counties, about half of the farm lan... is in hay or pasture. There is als... a high proportion of hay and pas... ture in southeastern counties, bu... less than a fourth of the land i... southwestern and western Minn... sota is in grasslands.

In general, the economists fou... that where more land was in gra... land, dairy farming was more po... ular.

Almost two-thirds of Minnesot... grasslands were permanently in h... or pasture. This land makes up abo... 20% of the total farm land in t... state. The highest proportion of p... manent grassland—40%—is in ... area just north of the Twin Cit... and the smallest proportion is in t... southwestern and western counties.



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Grace Urea Prills This Fall

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In the fall of the year, you'll find Grace Urea Prills offer you a real opportunity for *extra* profits.

That's because Grace Urea Prills is a *superior* nitrogen fertilizer *ideal* for fall application.

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√ Broadcast for small grains.

√ Fall fertilization of pastures.

Recommend these uses to your customers. And be sure you supply them with Grace Urea Prills. This special free-flowing form of urea "weathers" wonderfully. Its anti-leaching quality is definitely superior to other solid nitrogen fertilizers. And it is *guaranteed 45% nitrogen.*

To build up the nitrogen content in *liquid* fertilizers, use either Agricultural Grade Grace Crystal Urea or Grace Urea Prills. Both dissolve readily, *stay* dissolved.

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Florida Fertilizer Man Has Some Advice for Texas Citrus Growers

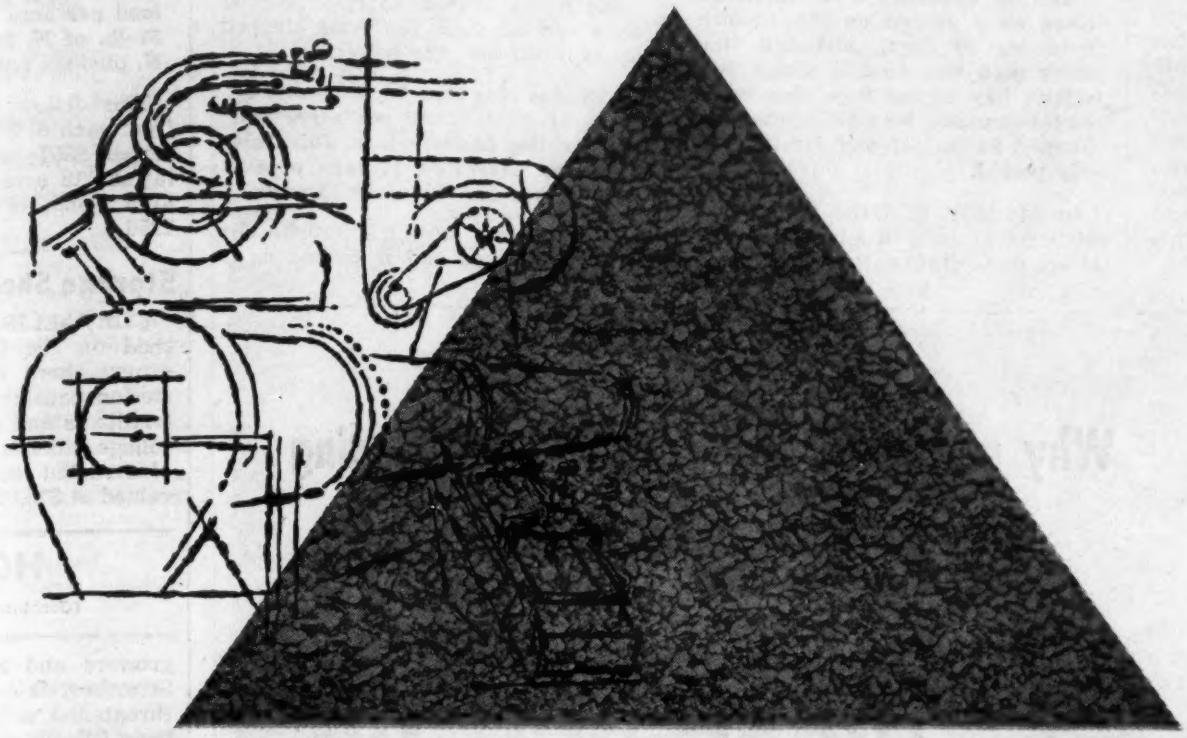
HARLINGEN, TEXAS—"The ma... difference between the Florida citr... producing area and the Lower R... Grande Valley of Texas is that Flo... ida started out with nothing a... built up its present proportions wh... the valley started with everythi... and, if it's not careful, will wind ... where we started."

That's what the man said. H... W. R. (Buster) Hancock, gener... manager of the Superior Fertiliz... and Chemical Co. at Tampa, pre... dent of the Florida Agricultur... Council, chairman of the governo... agriculture committee, secretary ... the Florida Farm Bureau and M... of the Year in Florida Agricultu... for 1957 as selected by Progressi... Farmer magazine.

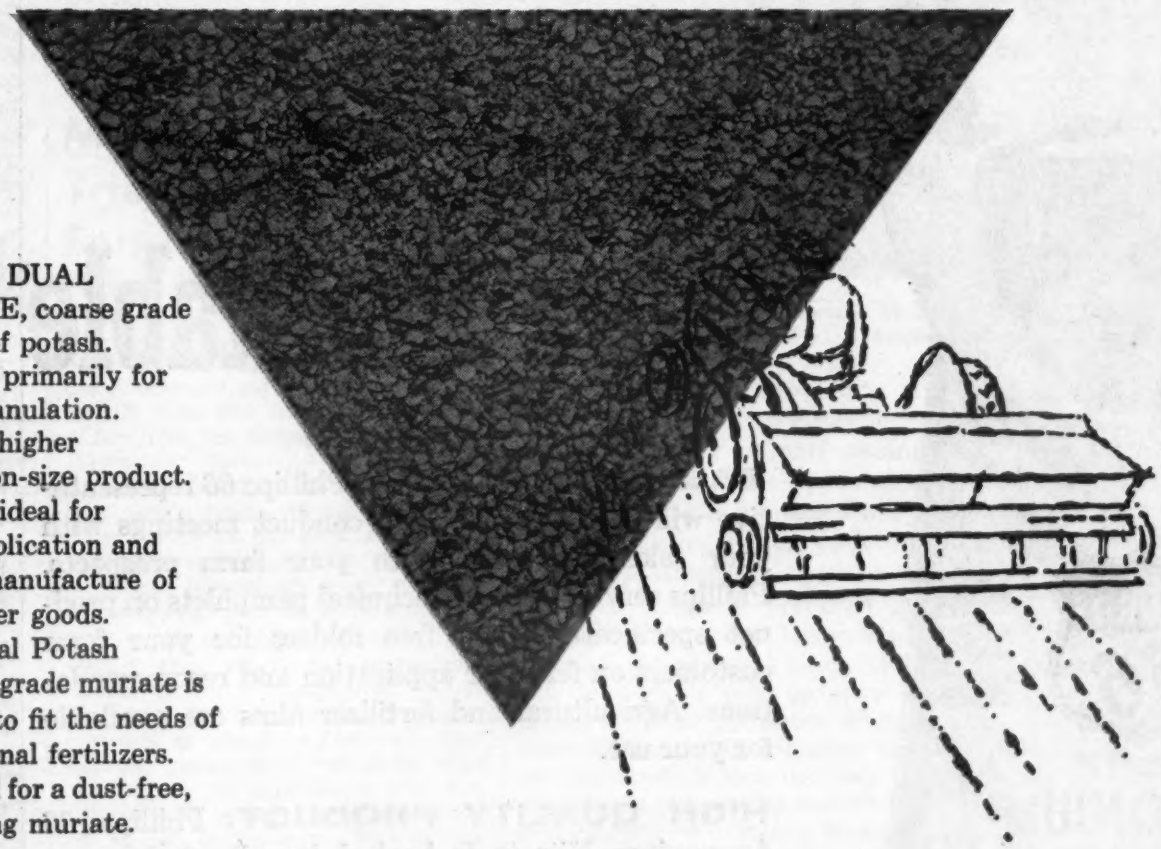
Mr. Hancock toured northe... Mexico citrus areas and the val... with Stanley Crockett, chairman ... the Texas Citrus Advisory Coun... He said that Florida started out wi... poor soil and had to build it up w... fertilizers and the use of minor e... ments for citrus trees. The Te... valley started out with a rich s... but is rapidly depleting it, he sa...

While the quality of Texas gra... fruit is outstanding, Florida may ... able to maintain its selling adva... tage because it has been able ... achieve higher yields through the u... of fertilizers, minor elements, ins... ticides, fungicides and other ag... cultural chemicals, he said. Flori... yields are around twice those ... Texas where growers have been t... prone to rely on the native fertil... of the soil. Mr. Hancock predic... that they would come around to m... widespread use of fertilizers a... minor elements for citrus.

Mexican production is even low... than that of Texas. The Tamauli... state average will be only two ... three boxes per tree even in the ol... producing areas. Mexican produc... fertilize on an average of only o... every two years.



LET NATIONAL POTASH SERVE YOU



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National Potash standard grade muriate is designed to fit the needs of conventional fertilizers. Processed for a dust-free, non-caking muriate.

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FIELD NOTES FROM THE COUNTY AGENT

Dairyman Records Profits from Long Term Fertilization Plan

By Raymond Rosson

County Agent, Washington County, Tenn.

What would you tell a farmer, if he came to you and said, "Look, I seeded a 15 acre field to alfalfa in 1956 and I have only a half stand. What would you advise?"

That is the question asked by one of our dairy farmers. He seeded the 15 acres in 1954 and he had only a half stand of alfalfa in 1955. We advised him to till and disc and sow three bushels of oats; 14 lb. of rye grass and 17 lb. of vetch per acre. We also advised him using 300 pounds of 6-12-12, 200 lb. of nitrogen and 200 lb. of 60% potash per acre. This was done in late August.

In December this farmer scattered six loads of manure per acre and in March, 1956 he applied another 100 lb. of nitrogen per acre.

During February and March 30 cows were grazed on the 15-acre field for 40 days. Although this dairy man was feeding silage and alfalfa hay at the time they were on this pasture, his milk production jumped 90 lb. per day for the 40-day period.

In late May, 1956, the 15-acre field produced 12 tons of silage per acre. After this, during the summer he mowed the alfalfa twice and harvested 1½ tons of hay per acre.

In August, 1956, he again tilled the alfalfa (which was better than the preceding August, without reseeding) and disced it once and sowed three bushels of oats, 17 lb. of vetch and 14 lb. of rye grass; using 300 lb. again of the 6-12-12 along with 200 lb. of nitrogen and 200 lb. of 60% potash. He did not sow any alfalfa in this seeding.

In December he applied the same amount of manure and in March, 1957, he applied another 100 lb. of nitrogen per acre.

He again grazed 35 cows for 41 days and his milk flow was stepped up as it did the year before.

In May this year he harvested 14 tons of good silage per acre, and during the first week of July this year he harvested 17 tons of excellent hay for the same 15 acres.

We saw this alfalfa before he cut it the last time and it looked as if he had a good 75% of a stand. Th farmer will get another cutting of a falfa hay before he seeds it again August.

In the two years, this 15-acre fie has produced 390 tons of very fi silage and some 54 tons of excelle hay, besides furnishing 2,500 cow-da grazing on a good pasture.

In other words this dairy man getting 13 tons of silage per acre p year. He is also getting two tons alfalfa hay per acre per year, as we as 84 cow-days grazing per acre p year.

This dairy man is applying plan food per acre per year as follows 51 lb. of N, 36 lb. of P, 158 lb. o K, plus six tons manure.

This fellow sold 10,922 lb. mi from each of 34 cows in 1956 and r ceived $507 per cow for milk. H farms 118 acres of land and he so $169 worth of produce per acre 1956.

Storage Shed Razed

CORVALLIS, ORE.—A storag shed on the Oregon State Colleg campus here was razed by an e plosion causing extensive damage fertilizers and chemicals stored in college officials report. The buildin constructed earlier this year, wa valued at $15,000.

A companion high nitrogen fertilizer for your quality mixed goods.

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SALES SERVICE: Your Phillips *66* representative will help you plan and conduct meetings with your sales force, and with your farm prospects. Phillips service includes technical pamphlets on product specifications and free folders for your farm customers on fertilizer application and recommendations. Agricultural and fertilizer films are available for your use.

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NEW YORK, N. Y.—80 Broadway
OMAHA, NEB.—6th Floor, WOW Building
PASADENA, CALIF.—330 Security Bldg.
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TULSA, OKLA.—1708 Utica Square
WICHITA, KANSAS—501 KFH Building

HOPPERS

(Continued from page 1)

growers and raisers of field crop Strawberries and prunes were bein threatened, and A. S. Mills, a farme from Gilroy, reported that the gras hoppers "have stripped 13 acres of m alfalfa and seven of my pastureland.

Meanwhile, control operations i what is perhaps the state's greates grasshopper invasion since 194 were underway from the mountai valleys of San Diego County to the foothill grasslands of northern Cali fornia. Federal, state and county agencies are cooperating on many fronts.

An example of such community e fort against the pests is found in Ker County where officials and land own ers joined to treat 135,000 acres b aircraft spraying.

Another program of this typ covering some 30,000 acres of valu able meadow pasture in San Dieg County recently was completed, a cording to the State Department Agriculture. Operations covering 3 500 acres in Alpine County are unde way.

In the San Joaquin Valley, gras hoppers have damaged local citru plantings in foothill areas of Tular County. Bait and spray application were made. Fresno, Kings, Mader and Merced counties also reporte grasshopper troubles.

In the North, Butte and Tehama counties experienced serious out breaks while Stanislaus, Colusa Yolo, Glenn and Shasta counties are developing sizeable trouble areas.

Sutter and Yuba counties have r stricted areas of potential concer and local outbreak conditions wer reported from Alameda, Lake, Mari and Santa Clara counties.

R. W. Harper, chief of the Sta Bureau of Entomology, said mo than 100 tons of poison bran ba had been spread in barrier strips halt the movement in Tehama Cou ty but the problem was complicate by nearly 300,000 uncontrolled rang land acres on east and west sides the county.

In Butte County, grassland terra of nearly 200,000 acres along t eastern foothills supports high gras hopper numbers. Damage predom nated in grain, clover, alfalfa, well as olive and other orchard plan ings.

Mr. Harper said that the next f weeks will be critical with respe to the problem.

Special Merchandising Section

Better Selling

Marketing News and Features

Store Nitrogen In Soil During Winter Months

Illinois Specialist Discusses Factors of Fall Fertilization

By EDWARD H. TYNER
University of Illinois

Applying nitrogen in the fall helps to distribute the labor load on farms and relieves storage problems of fertilizer companies. In humid regions there is a possibility that a good part of nitrogen applied in the fall may leach out. On the other hand, such applications can be made satisfactorily by giving careful attention to these points:

1. **Kind of carrier applied**
2. **Amount of nitrogen applied per acre**
3. **Soil temperatures at time of and after application**
4. **Soil characteristics, particularly subsoil permeability**
5. **Rainfall and depth to which water percolates**
6. **Vegetative cover**
7. **Kind of residues plowed under**

Soils contain available nitrogen in both nitrate and ammonium nitrogen forms. Nitrate nitrogen is leachable. Ammonium nitrogen is nonleachable and remains so unless microbes convert it to nitrate nitrogen.

Some fertilizers may supply nitrogen in either nitrate or ammonium form or in varying combinations of both. Still others, such as urea and calcium cyanamid, contain neither nitrate nor ammonium nitrogen.

But, when soil temperatures and moisture are favorable, microbes convert these materials first to ammonium and then to nitrate nitrogen. The potential loss of fall-applied nitrogen on permeable soils in areas of relatively high rainfall will therefore depend on the carrier. The potential leachability of nitrogen carriers is shown in Table 1.

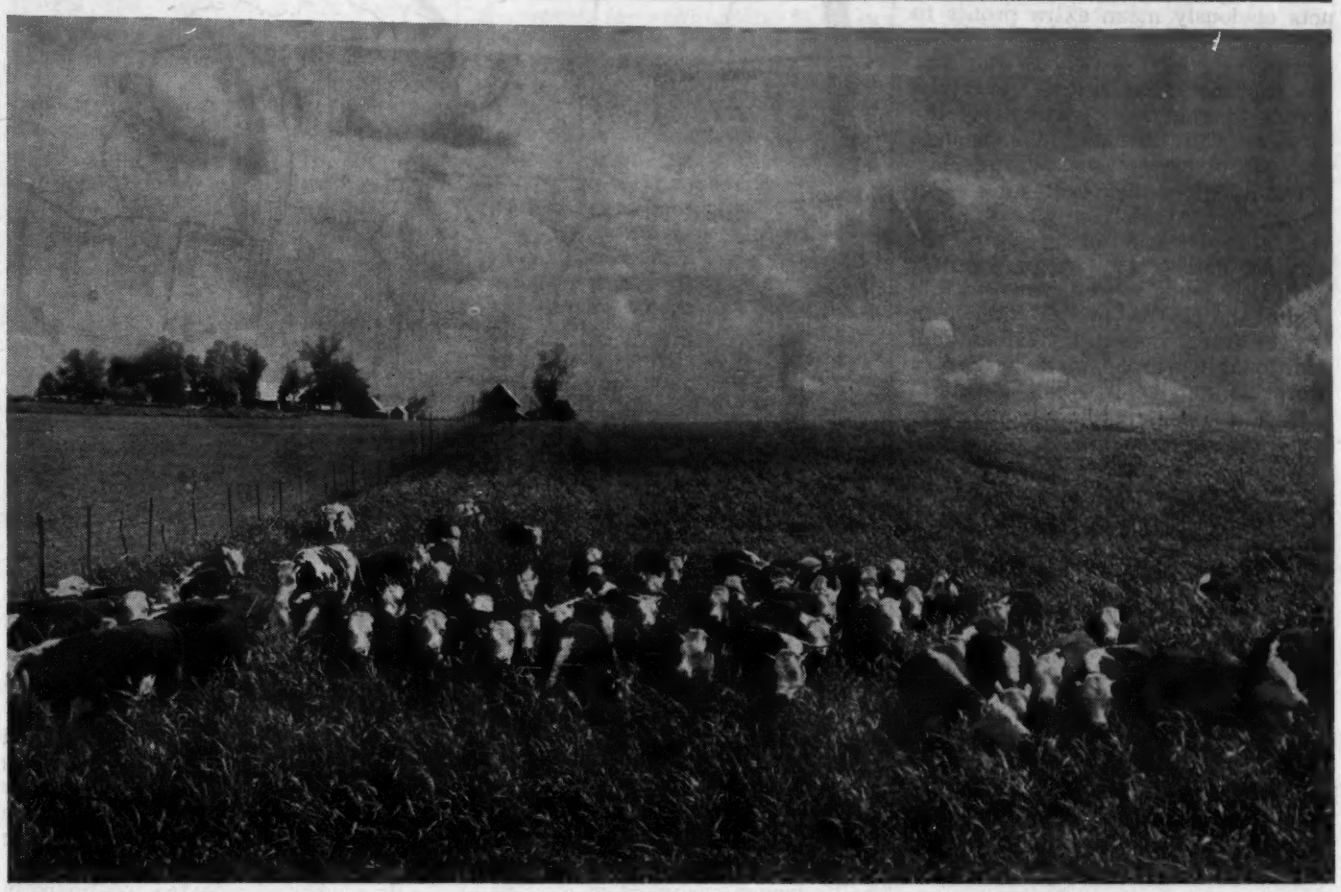
The microbial population must be relatively inactive if a soil is to retain fall-applied nonleachable nitrogen. Nitrification, which is a function of certain bacteria, ceases at 32° F. The rate of nitrification is low at temperatures ranging from 50° to 55° F. In Illinois soil temperatures drop below 50° F. rather rapidly in the fall. Under these conditions nitrification soon ceases. If possible, therefore, nonleachable forms of nitrogen should not be applied until the soil reaches this temperature.

One can wait for nitrification to cease entirely and risk bad weather that may prevent making a fall application of nitrogen. Or one can apply nonleachable nitrogen at slightly higher soil temperatures during favorable weather, knowing that some

(Continued on page 16)

TABLE 1. The Potential Leachability of Nitrogen Carriers Applied on Permeable Well-Drained Soils

Nitrogen carrier A-N-L	N (pct.)	Leachable (pct.)	Nonleachable (pct.)
Ammonium nitrate	20.5	50	50
Ammonium sulfate	33.5	50	50
Ammonium sulfate-nitrate	20.5	..	100
Ammo-phos (16-20-0)	26.0	24	76
Anhydrous ammonia	16.0	..	100
Calcium cyanamid	82.0	..	100
Cal-Nitro	20.0	..	100
Nitrate of soda	20.5	50	50
Solution 37	16.0	100	..
Uran 32 (Sol. 32)	37.0	32	68
Urea	32.0	24	76
	45.0	..	100



GOOD PASTURES MAKE CONTENTED OWNERS, TOO—Adequate fertilization and careful maintenance cut feed costs and allow longer grazing season on lush pastures. Farmers realize better income from well-fertilized pastures on a grassland economy. Seen here is a supplementary pasture of sudan grass which made good feed for herd of Hereford yearlings on a farm near Weeping Water, Nebraska. Midwestern farmers form a great sales potential for fertilizers and herbicides to be utilized on pasture and range lands. (USDA Photo)

Minnesota Pasture Trials Show How Fertilizer Pays

ST. PAUL. MINN.—A total of some fifty persons participated in the July 1-2 pasture fertilization tour in northeastern Minnesota conducted by the Minnesota sub-committee of the Middle West Soil Improvement Committee. Charles Simpkins and Ermond Hartmans, University of Minnesota extension specialists had planned the tour which began at the University farm school in St. Paul and terminated the next day in Carlton county where inspections were made of bluegrass pastures on private farms.

The Grand Rapids Station was visited first, where the group was shown pastures comprising largely bluegrass which had received varying amounts of complete fertilizers during the year. Some ten plots were involved in this experiment, with fertilizer being added at rates of from 50 to 300 lb. an acre. Two of the plots served as checks, receiving no additional fertilizer.

Final results of the 1957 trials will not be known until later in the season, since measurements of yield are based on the utilization of the forage through grazing. (Cow-days of pasture and pounds of milk produced to the acre.)

In 1956, a similar test using seven locations brought significant results, the University revealed. After applications of 100 lb. nitrogen, 60 lb. P_2O_5 and 60 lb. K_2O, the fertilized area produced 4,333 lb. milk an acre, and allowed 223 days of grazing. The unfertilized area yielded only 2,000 lb. milk and 101 cow-days an acre.

The caravan then drove to Carlton, Minn. to visit the farm of George Oraskovich who has been keeping records on permanent grass pasture areas and alfalfa-brome pasture on

(Continued on page 15)

SHOP TALK

OVER THE COUNTER

By Emmet J. Hoffman
Croplife Marketing Editor

As mentioned elsewhere, this issue is the second in a series of four intended to help everyone connected with the sale of fertilizer to achieve a better volume during the off-season months, particularly in fall. Likewise, the material in this special emphasis issue is aimed at promoting the increased use of fertilizer on pasture and range land, areas which have been undernourished in plant food far too long for efficient production.

The specially prepared material is intended to put money in the dealer's pocket. Dealers will find it directly beneficial to glance through the editorial material found in this issue and put the information to work to pick up more off-season fertilizer customers. Pastures generally lack fertilizer because farmers and ranchers have not been fully educated to the benefits possible from getting them up to peak efficiency.

Agronomists agree that one of the best ways to keep pastures producing is to fertilize them. Pasture grasses need plant nutrients just the same as any other crop.

The use of fertilizers on pastures helps to improve the quality of the forage. It also helps the livestock to make proper and profitable gains on the pastures. Fertilizing also helps to keep the proper plant mixtures in the pasture. And one of the best ways to use the moisture efficiently is to have a soil high in plant nutrients.

Every dollar spent for fertilizer on pastures will return from $2 to $10, depending on the crop, available water and management. It is common to double pasture and meadow yields with fertilizer.

This is the story that has to be gotten to the farmer and the rancher and the fertilizer dealer is in the best position to tell this story. This special issue is published so that dealers and fertilizer salesmen can avail themselves of some ammunition in bringing the story to their customers and prospects.

"You can quit your acting now, Neil. I heard the boss say this morning that he's going to fertilize this pasture." (From Plant Food News)

IMPORTANT SELLING POINT . . .

Off-Season Fertilization Adds to Profits

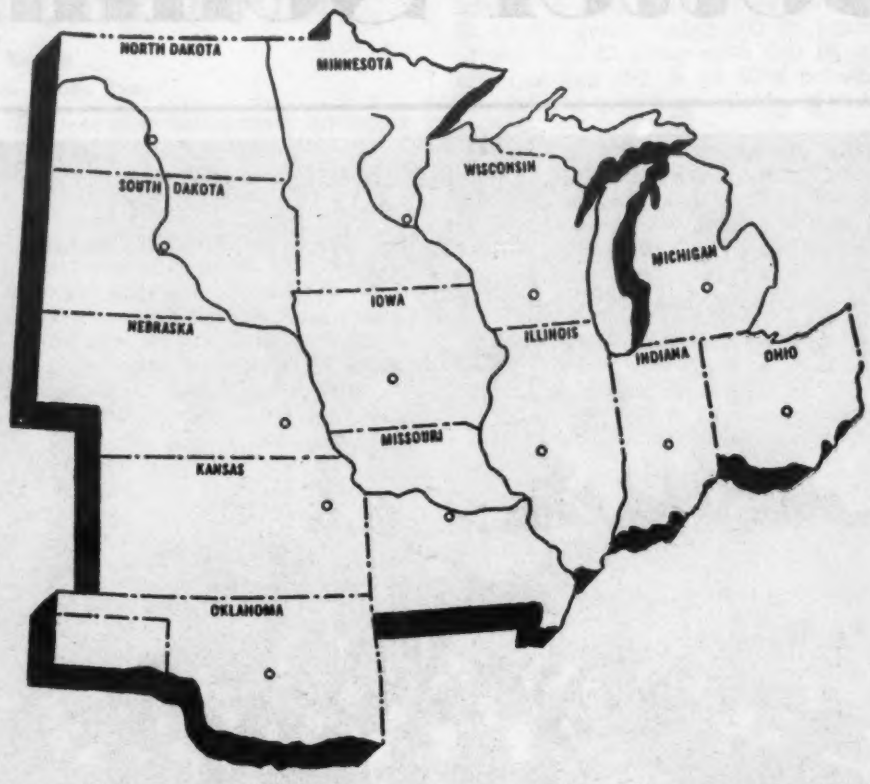
Both Buyer and Seller Of Fertilizer Benefits

Additional sales of plant food products obviously mean extra profits to the fertilizer industry, from manufacturer through dealer. In the case of pasture fertilization, everyone stands to gain . . . particularly the farmer who invests in adequate amounts of plant food materials.

The middlewestern states are especially adapted to the late summer and fall application of fertilizers, not only for field crops, but for pastures and range lands as well. Farmers told about the extra profits they can realize from modest investments in additional plant food, make good sales prospects.

Here are some of the recommendations and profit-making ideas generated in some of the middlewestern states by the agricultural experiment stations during the past few years. If further details are needed, the extension service of the state experiment station will be happy to furnish additional data keyed to local areas.

Pasture fertilization and maintenance pays off! Here are some examples of how it is done in various states:



OHIO

Meadows and rotation pastures may be topdressed during the fall, early spring or following any harvest. "Adequate fertilization and proper management are essential to the maintenance of legume stands," the Ohio Agricultural Experiment Station says.

Meadows containing less than 30% legumes should be topdressed during the fall or early spring with 60 to 80 lb. nitrogen. This nitrogen may be obtained from a 10-10-10 or similar analysis fertilizer or from straight nitrogen fertilizers.

On soils very low in phosphate seedings in wheat, winter barley or rye are often benefited by applications of extra phosphate fertilizer at the time of making the seeding. The recommended application is 200 lb. 0-20-0 or 125 lb. 0-20-20 or 0-20-10 an acre with the legume seed. The amount of potash applied with the legume seed should not exceed 25 lb. an acre.

Band seeding is recommended for seedings with oats and those made without a companion grain crop. In order to band seed, the hose or tubes from the seed box should be so arranged that the legume seeds fall 10 to 12 inches behind the disks and directly over the band of fertilizer. "Nothing is gained if the legume seed falls one-half inch or more to one side of the fertilizer band," the station warns.

An application of 40 to 60 lb. an acre of nitrogen on fair to good sods will advance early spring grazing by 2 weeks and will greatly increase spring growth. This application may be made in the fall or early spring. The acreage treated should not exceed one-third acre for each cow to be grazed. Where all fertilizer nutrients are needed, an application of 500 lb. an acre of 10-10-10 or 14-7-7 is suggested.

The accompanying table gives recommendations for fertilization of legume-grass mixtures and of permanent pasture lands. Data from Ohio Agricultural Experiment Station.

One of the most important possibilities of weed spraying in pastures is the eradication of patches of Canada thistle by repeated sprayings with 2,4-D.

Control of Canada thistle can be obtained with the use of sodium chlorate at 3 lb. a square rod. This constitutes the only "one shot" treatment for Canada thistle so far available. For two or three square rod patches, this may be the best recommendation. Retreatments should be expected.

No single dose of 2,4-D has killed thistles at one treatment. 2,4,5-T is definitely less effective on thistles than 2,4-D, and NCP was no more effective than 2,4-D in corresponding formulations.

In studies of repeated treatment in Ohio, one half pound an acre has been more effective than any heavier rate, apparently because heavier doses kill the tops so quickly and rapidly that there is little opportunity for the 2,4-D to be translocated to roots and kill them. On the other hand, one fourth pound an acre was definitely too little and ineffective.

The best treatment for Canada thistle, then, to date is to treat twice a year with 2,4-D at one half pound an acre of amine salt formulation for three years, perhaps more. Only a few stragglers will be left after two years. The first treatment each year should be made at bud to early bloom and second after growth is well started in August or September.

According to Dr. C. J. Willard, department of agronomy of Ohio State University, it should be borne in mind that any 2,4-D treatment that will kill weeds in pastures will also kill or severely injure alfalfa, red clover, alsike clover, or sweet clover that may be present. White clover "including Ladino" is fairly tolerant to light applications of 2,4-D, but repeated applications will kill it.

Ohio Recommendations

Legume-Grass Mixtures

For meadow or rotation pasture:

	SOILS HIGH in Nitrogen, Phosphate and Potash					SOILS LOW in Nitrogen, Phosphate and Potash				
	USE Fertilizer* Lbs./A	Grade	TO SUPPLY Nitrogen N	Phosphate P_2O_5	Potash K_2O	USE Fertilizer* Lbs./A	Grade	TO SUPPLY Nitrogen N	Phosphate P_2O_5	Potash K_2O
Seeding with small grain companion crop	300	6–12–12	18	36	36	450	4–16–16	18	72	72
Seeding without small grain companion crop	225	4–16–16	9	36	36	450	4–16–16	18	72	72
Maintenance First year (broadcast)	None		0	0	0	350	0–20–20	0	70	70
Each succeeding year (broadcast)	200	0–20–20†	0	40	40	400	0–20–20	0	80	80

* The fertilizer grades listed in this table are the minimum grades recommended for use in Ohio.

† or 400 pounds 0-20-20 every 2 years.

Permanent Pasture

(Bluegrass—White clover)

	SOILS HIGH in Nitrogen, Phosphate and Potash					SOILS LOW in Nitrogen, Phosphate and Potash				
	USE Fertilizer* Lbs./A	Grade	TO SUPPLY Nitrogen N	Phosphate P_2O_5	Potash K_2O	USE Fertilizer* Lbs./A	Grade	TO SUPPLY Nitrogen N	Phosphate P_2O_5	Potash K_2O
Apply every 2 or 3 years	200	0–20–20	0	40	40	500	0–20– 0	0	100	0

* The fertilizer grades listed in this table are the minimum grades recommended for use in Ohio.

brought the yield up to 2,320 lb., while lime and potash made it 2,840 lb.

The biggest yield, however, came from treatment with lime, potash, superphosphate and nitrogen. This brought a yield of 4,480 lb., the Illinois station reports.

The control of wild garlic, wild onions and winter brush in Illinois is also an important economic factor, the University says. These plants cause Illinois farmers to lose an estimated $500,000 or more a year through dockage in wheat and undesirable flavors in milk and meat products. Controls include cultural practices such as plowing in either late fall or early spring to smother germinating plants, or chemical control. The latter is not easy, the station says, but it is possible to control in their growing stages with heavy applications of 2,4-D. Recommended timing for such application is April.

WISCONSIN

Fertilization and good maintenance can do wonders for pasture lands in Wisconsin, according to the state experiment station at Madison. Following a recent survey of some 350 Wisconsin farms which took part in a two-year grassland farming program, it was found that there isn't a single acre of land in the state too good to be used for pastureland!

Here are some of the facts gained from the survey:

Some of the pastures entered in the program produced better than 5,000 pounds total digestible nutrients an acre. This is equivalent to 100 bu. corn, over 200 bu. oats or five tons of high quality hay.

He summarizes that the average production of the 350 farms was just below 2,400 lb. total digestible nutrients (TDN). That would match 50 bu. corn, 100 bu. oats or two and a half tons of hay.

The top pastures generally had at least 50% Ladino clover and were harvested by strip grazing or green feeding.

On the other end of the production scale were woodland pastures which produced at the extremely low rate of 288 lb. TDN an acre. Permanent unimproved bluegrass pastures ranged from 600 to 900 lb. TDN. Renovated pastures ranged from 3,000 to 4,000 lb. TDN.

Production is only part of the picture, according to the University. It costs from one half to one cent a pound to produce good pasture. Cost per pound of TDN from hay is somewhere between one and a half and two cents a pound. Farm grains run up to three and a half cents.

It was thus concluded that those farmers who get high production from pasture will be well ahead of farmers who must pay for a high share of their feed from other sources.

One other lesson is pointed up in the summary. Pound for pound Ladino clover has more nutritional value than any other forage grass or legume in Wisconsin, it was found.

Prof. C. J. Chapman of the University of Wisconsin department of soils, long an advocate for greater use of nitrogen on pastures and other crops, says that pasture improvement through the application of 10-10-10 or other high nitrogen fertilizer presents a great opportunity for low unit cost milk and meat production in Wisconsin.

"There are thousands of acres of pasture land in Wisconsin where the application of 500 lb. 10-10-10 an acre every second or third year, with ammonium nitrate or other nitrogen applied during the intervening years will be a highly profitable investment," he declares. "Some agrono-

ILLINOIS

Experiments in Illinois on alfalfa with lime and phosphate brought significant results. As compared to a check plot which produced 2,360 lb. alfalfa with no lime or fertilizer added, the addition of 1,500 lb. superphosphate brought the yield up to 6,560 lb. The same amount of rock phosphate made a yield of 6,120 lb., and 1,000 lb. rock phosphates plus 500 lb. superphosphate resulted in a yield of 6,020 lb.

In another test extending over a 9-year period (1947-1955) the addition of nitrogen and phosphate to plots already treated with lime and potash, brought significant results.

The check plot yielded 2,300 lb. hay. Compared to that, the area treated with rock phosphate increased the yield to 5,400 lb. The addition of nitrogen made 4,200 lb., while nitrogen plus rock phosphate made it 5,320 lb. A combination of nitrogen and superphosphate produced a yield of 4,980 lb.

In another 7-year experiment, a check plot of alfalfa-clover-timothy produced 240 lb. on the average. The addition of lime to a similar plot

ists say to apply 10-10-10 every ear," he adds.

In discussing the application of fertilizers in the fall on old alfalfa, grass asture and timothy-brome fields, rof. Chapman advises that straight itrogen may be applied in late fall o old grass pastures or timothyrome fields on heavy soils in the Northern states, but give these a iberal application of 0-20-20 or 0-10-0 to back up this nitrogen. "Conine application of 10-10-10 or straight itrogen to the heavier silt or clay oam soils, and delay application until mid-October or until the temperature f the soil drops below 60°.

"Anhydrous ammonia knifed into the cool, moist silt and clay loam soils in late fall stores perfectly under Wisconsin conditions, and it's cheaper storage than when held in the big expensive steel tanks. It can be cut or 'knifed' into grass pastures, hay meadows, or stored in fall-plowed fields which are to be fitted for grain, corn, or other crops the following spring.

"Anhydrous ammonia is fixed chemically and held by the clay fraction. It's there all ready to feed your crop when these fields warm up in the spring.

"The cost per unit of nitrogen will be less when you buy and apply in the fall. Remember storage is one of the problems of the anhydrous ammonia manufacturer. He is anxious to keep his plant in continuous production and will make some price concessions to those who will take part of his off-season output.

"Fall purchase of fertilizer will help to relieve the lack of factory storage space and will help to get away from the 'last minute run' on fertilizer plants in late spring. It will tend to provide better service in delivery, and will increase the supplies available to farmers who can also relieve their own rush of spring work by fall application."

Here are some of Prof. Chapman's suggestions for fall use of fertilizers:

1. Topdress new seedings of alfalfa and clover or old established fields of alfalfa in early fall in the manner previously indicated. The resulting increased vigor often prevents winterkilling.

2. **Fertilize fall-seeded wheat or rye at the time of seeding, (nitrogen topdressing should be delayed till late fall).**

3. Lime and fertilize permanent pastures being renovated in the fall at the time the land is being worked up.

4. Pasture not being renovated may be topdressed with phosphate-potash mixtures at any time. Fall application of straight nitrogen fertilizer or 10-10-10 should be limited to non-sandy soils and withheld until late fall.

5. Apply fertilizer such as 0-10-30 in the fall to fall-plowed fields which are to be seeded to small grain and legumes the following spring.

OKLAHOMA

Oklahoma A&M College has made strong points in favor of fall fertilization. Here is what it has to say on the subject:

"Fertilization of improved pastures during the fall or early winter months in Oklahoma is a 'must.' This applies for successful maintenance of both warm season and cool season grass-legume combinations. Satisfactory establishment of cool season grass pastures and establishment of clovers and vetch in warm season grass pastures can be accomplished only with adequate fertilization at that time.

"Phosphorus is usually the first limiting plant nutrient for legume production on most soils in the state. Adequate potassium must also be supplied to maintain legumes in grass-legume pasture mixtures. Application of these plant nutrients during the fall months is particularly desirable to improve early growth of annual reseeding winter legumes.

"Nitrogen applied with fall seeding of the cool season grasses such as brome, fescue and orchard grass, is likewise necessary to increase early growth and vigor of the young plants prior to the winter extremes in temperature and moisture.

"Fertilization of native grass ranges and meadows is not recommended as a general practice in Oklahoma at present. Use of stocking rates suited to seasonal carrying capacity of the native grass ranges along with weed and brush control offer greatest possibilities for improvement and profitable maintenance of these extensive native grass areas."

Brush Control in Oklahoma

For weed control on native grass areas, one pound of 2,4-D an acre should be used. The time of application depends on moisture conditions and stage of growth of the particular weed species involved. May and June are the best months for spraying pastures in Oklahoma. If susceptible crops are nearby, the amine type of 2,4-D should be used. The ester formulations may be used if other crops will not be endangered. Because of the low cost of chemicals for this treatment (approximately $1.00 per acre), over 50% of the range land of Oklahoma could be sprayed profitably.

In all tests from the Oklahoma State University Station, a good turf of properly managed grass has been the best method for weed control. Treatments with 2,4-D have been superior to mowing on native pastures. The extended drouth and overgrazing in the last four or five years has destroyed or weakened the desirable grasses, making it possible to use 2,4-D to a greater advantage than ever before. Not only must weed competition be eliminated for revival of the old established grasses, but new young grasses must be protected.

Most of the improved pastures in Oklahoma are planted to Bermuda grasses and legumes. This grass is very competitive and weeds usually are not a great problem. 2,4-D cannot be used on the legumes in these pastures, but some herbicides now being tested look promising for selective weed killers for use on some of the forage legumes adapted to Oklahoma.

Oklahoma's recommendations for the control of the millions of acres of useless scrub oak growing on ranges in Oklahoma is 2 lb. low volatile 2,4,5-T an acre the first year, followed with a 1 lb. application the second year. Usually, the chemicals are applied with an airplane in May or June using 4 gal. water and 1 gal. diesel oil an acre as a carrier. To give the young grasses under the trees

(Continued on page 14)

PENCO DEFOLIANTS AND DESICCANTS

ENDOTHAL*

DE-FOL-ATE®

PENITE-6X®

PENTA CONCENTRATE 40

DESICCANT L-10

*Endothal is the accepted generic name for 3, 6-endoxohexahydrophthalic acid. The manufacture and use of endothal products are covered by one or more of the following U. S. patents: 2,550,494; 2,576,080; 2,576,081; 2,576,083; other pats. pend.

THROUGH pioneering research and development of defoliants and desiccants, PENNSALT has become a leader in this field of agricultural chemicals. Because chemical harvest aids make harvesting easier, more economical and, therefore, more profitable, the use of these products is rapidly increasing. Through technical development, PENNSALT is constantly striving to improve its widely used defoliants and desiccants. In the meantime, in seeking a *perfect* defoliant, several candidates are being field tested. The newest one is PENCO DESICCANT L-10, which is available this season for use on cotton.

So, for increased sales and profits, stock the broad line of PENCO defoliants and desiccants. Write your nearest PENNSALT CHEMICALS office for service bulletins.

PENNSALT OF WASHINGTON DIVISION

PENNSALT CHEMICALS CORPORATION

(Formerly Pennsylvania Salt Manufacturing Company of Washington)

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Producing Chemicals for Farm, Home and Industry for Over 106 Years

Pennsalt Chemicals

Midwestern Dealers

VELSICOL CHEMICAL CORP. offers its dealers a store banner 11 x 26" in size, urging customers to make use of insecticide-fertilizer mixtures for control of soil insects. The banner is suitable for placing near bags of mixed goods, on the bulletin board, or in a display window. Fluorescent red background with black letters make the banner an eye-catcher. Check Item No. 1 on coupon.

the fence rider
Is Here!
...to Clean Weeds and Brush from Fence Rows and Ditches
kills weeds and brush
along fence rows and ditches
THERE'S NO NONSENSE about killing weeds and brush when you use Diamond Black Leaf's FENCE RIDER. You don't need any knowledge of chemistry or chemical terms—just ask your local dealer for THE FENCE RIDER and spray fence rows, drainage ditches, other uncultivated areas to get rid of weeds and brush easily and economically. Kills hardwood, Canada thistle, cocklebburs, knapweed, lambquarters, mustard and many other broad-leaf weeds; kills alder, aspen, birch, brambles, chalk cherry, elder, elm, hawthorn, hickory, poison ivy and poison oak, sagebrush, sassafras, sumac, sweet gum, willow and other types of brush. ECONOMICAL as well as easy to use—simple directions are printed on each can. See your dealer today for THE FENCE RIDER—another of Diamond Black Leaf's complete line of chemical products for farm use.
Diamond Black Leaf Company
Black Leaf
fence rider
Kills Weeds & Brush
In the Field...in the Barn...in the Feed Lot...
BLACK LEAF RESEARCH
Protects Farm Products and Farm Profits!

DIAMOND BLACK LEAF CO. offers advertising and other information on its new weed killer product, "Fence Rider." Illustrated are two advertisements for use of dealers who stock this product. Can be utilized in stores, in window displays, or as mailing pieces locally. Each piece is 4½ x 13½". Check item No. 2 on the coupon.

Now MWSIC Fall Fertilizing Folder Ready for Distribution by Industry
A new MWSIC folder entitled "Fertilize This Fall," aimed at helping promote fall sales, is now ready for immediate distribution to member companies of the Middle West Soil Improvement Committee.
Sample copies of this new sales-help have been mailed to all members so they can place orders for quick delivery. This will enable them to release the folder through all their sales distribution "pipe lines" in plenty of time to reach dealers and farmers for the fall fertilizer trade.
Make Money, Save Work
With a first page sub-title of "Make Money, Save Work, Save Time," this new fall fertilizer folder is printed in black and white, with duo-tone front cover.
The folder's size is 6 inches by 3⅛ so it will readily fit into a statement-size envelope or be used for salesmen distribution to dealers. Opened flat, the new sales aid is 11⅛ x 13 inches.
Here is what the folder contains:
1—The reasons farmers give for fall fertilization. This section tells why it makes farmers' operations easier and more profitable.
2—"How Corn Belt Colleges Feel About Fall Fertilization." Statements from each of the 13 Middle West colleges by a staff agronomists or soils man. These point up the potential crops and the State results from fall fertilization.
3—Specific crop-by-crop information on fall fertilization of wheat, corn, meadows and pastures—with each covered individually. This tells what the farmer needs to know in order to apply fertilizer profitably, save extra spring trips over the field, and help protect fall-sown crops from winter damage.
4—Pictures showing the results of college fall fertilizing tests on each crops. Fall plow-down, disking, Fall
fertilize THIS FALL
make money
save work
save time
New fall fertilizer folder fits easily in statement-size envelope.
member
1,000 for

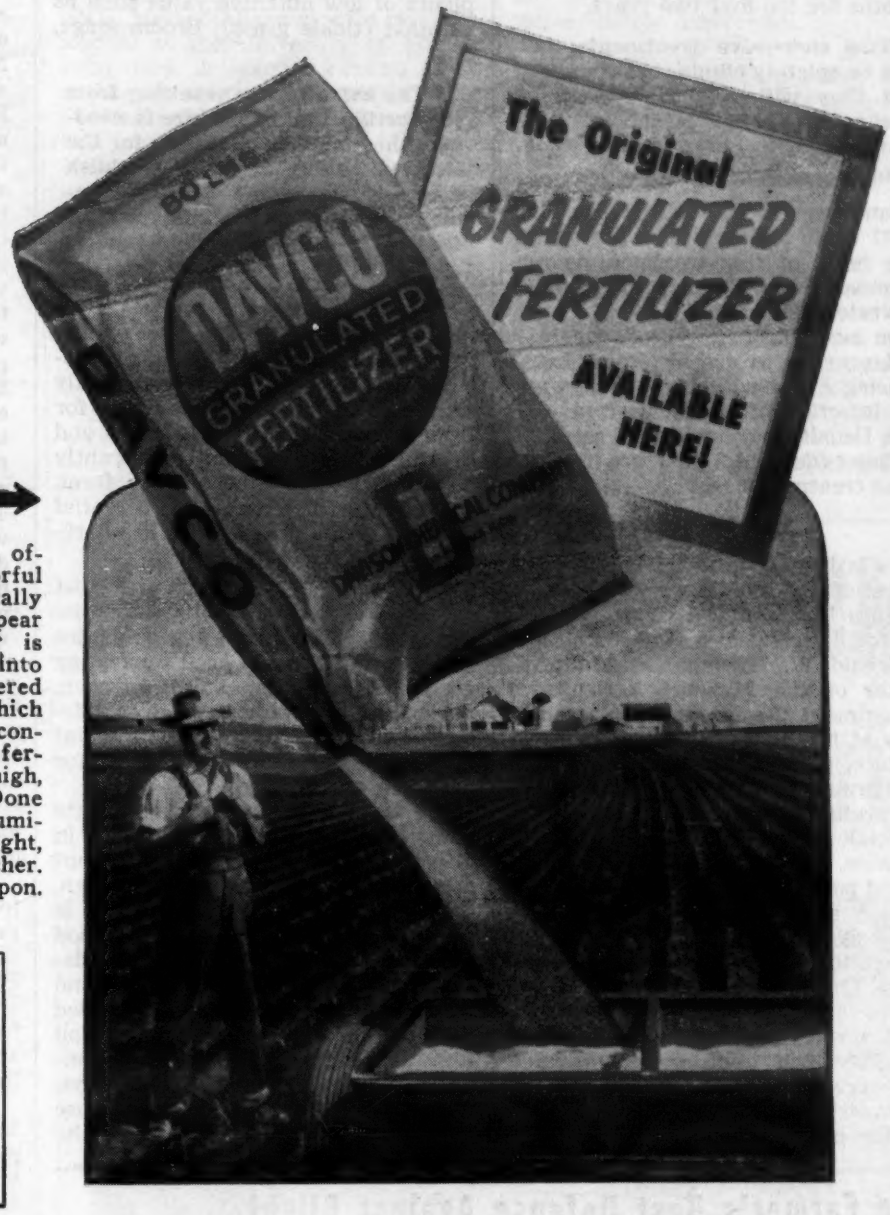
THE MIDDLE WEST SOIL IMPROVEMENT COMMITTEE has folder-booklet available for promotion of fall fertilization. Designed to increase fall sales of plant food materials, the folder presents facts, figures, sales pointers, illustrations and other information useful to the dealer in discussing the matter with farmer customers in the store. Check item No. 3 on the coupon.

HERE ARE REASONS FARMERS GIVE FOR FALL FERTILIZATION

- Fall fertilization gives better spread of work. Fertilizer put on in the fall speeds planting in the spring.
- An extra spring operation is saved when all the fertilizer needed by fall sown crops is put on at planting.
- Machinery pulls easier and does less damage with the soil in its best physical condition.
- Larger machines can be used that save time and labor.
- Broadcasting and plowing down puts the fertilizer in moist soil which increases its efficiency in a dry year.
- It's better to risk the loss of a little nitrogen than to risk not getting fertilizer on at all.
- Any slight loss of nitrogen often costs less than an extra trip over the field.
- Late summer or fall top-dressing helps hold the legume in grass-legume mixtures.
- It's easier to get the exact fertilizer ratio and grade you want.

Order These Sales Aids

DAVISON CHEMICAL CO. offers its dealers a colorful motion display, electrically operated to make it appear that granular fertilizer is pouring out of the bag into the spreader. It is powered by 110 v AC motor which turns a plastic wheel containing actual granular fertilizer. Display is 17½" high, 11" wide and 5" deep. Done in four color art and illuminated with an electric light, the display is an eye-catcher. Check item No. 6 on coupon.



MONSANTO CHEMICAL CO. offers its dealers numerous sales helps for herbicides, many suitable for promotion for pasture and range land. The display above is self-explanatory. It is an outstanding means to compel attention and to help the sales efforts on in-the-store customers.

Monsanto also offers advertising mats and similar material for its dealers to place in local newspapers. Some of these are shown here. (above) Check item No. 4 on coupon.

NITROGEN DIVISION has a large number of advertising mats available for its dealers. Below are shown a few which emphasize pasture fertilization. They are two and three columns wide, and the logos can be incorporated in other ads the dealer may run. For an assortment check item No. 5 on coupon.

NEW...EASY WAY TO MAKE PASTURES P
"I'm using more this fall than ever before"
"This pasture got ARCADIAN 12-12-12"
URAN* makes the grass grow GREEN!
UREA 45 makes grass come alive!
NITRANA* NITROGEN GROWS BEEF!
See Your Arcadian URAN Dealer Today!

Please send me the items checked:

- No 1. Heptachlor Store Banner
- No. 2. Fence Rider Advertisements
- No. 3. Fall Fertilization Booklet
- No. 4. Display Stand and Newspaper Mats
- No. 5. Nitrogen Advertising Mats
- No. 6. Electric Motion Display

☐ PESTICIDE DEALER ☐ FERTILIZER DEALER

Name of Firm

Address

City Zone State

Signature

Clip Out—Fold Over on This Line—Fasten (Staple, Tape, Glue)—Mail

FIRST CLASS PERMIT No. 2
(Sec. 34.9, P. L. &R.)
MINNEAPOLIS, MINN.

BUSINESS REPLY ENVELOPE
No postage stamp necessary if mailed in the United States

POSTAGE WILL BE PAID BY—

Croplife

P. O. Box 67

Reader Service Dept. Minneapolis 1, Minn.

OFF-SEASON FERTILIZATION

(Continued from page 11)

a chance to become established, grazing should be confined to the winter months for the first two years.

Two successive treatments will not completely eliminate scrub oak, but they will give the grasses a chance to become established and compete with the young oak sprouts.

Sand sage is controlled with 1 lb. 2,4-D ester an acre. Three consecutive years of this treatment is recommended for Shinnery oak found in western Oklahoma.

On small farms, or areas where it is dangerous to use airplanes, brush is being killed with basal sprays and the injection of chemicals into each tree. Usually, a concentrated selection of diesel fuel and 2,4,5-T are used for these treatments.

MISSOURI

As is true in practically all of the states of the middle west, Missouri's pasture lands offer a large potential for fertilizer sales.

Arnold W. Klemme, assistant director of the Missouri Agricultural Experiment Station and professor of soils at the Missouri College of Agriculture, puts it this way:

"Permanent pastures offer a place for profitably increasing use of commercial fertilizer in Missouri. Fertilitywise, pastures are the most neglected part of the farm. There are 4.3 million acres of crop land used exclusively for pasture which is equivalent to an average of 46 acres per farm. Only about one acre in 10 receives any fertilizer, yet numerous field tests show that well balanced fertilizer will approximately double the acre yield of forage as well as improve its nutritive value. Soil treatments of fertilizers encourage the growth of the more nutritive forage plants enabling them to crowd out plants of low nutritive value such as Aristida (tickle grass), Broom sedge, etc.

"The extra forage resulting from the fertilization of pasture is needed either for immediate use for the livestock on hand or to establish a reserve as silage or hay for summer drouths and/or for winter feeding. Fall is an excellent time to apply and work fertilizers into the pasture soils.

"The more extensive use of the practice of properly fertilizing pastures can be expected to significantly reduce the expenditures for feed for livestock, give more rapid gains and healthier livestock and significantly increase livestock income per farm. Pasture fertilization is a potential market for fertilizers which has barely been touched in Missouri."

C. M. Christy, extension specialist in the University of Missouri's department of soils, says the emphases in Missouri is on the need for testing good soil samples, lime, nitrogen, phosphate and potash used in adequate amounts to correct mineral deficiencies, and nitrogen enough for productiveness.

Tests made in the state indicate that the typical plant food needs in Missouri to establish semi-permanent pastures consists of 50 lb. nitrogen, 150 lb. P_2O_5 and 50 lb. K_2O. This is given merely as a typical plant food need. However, the best way to determine specifically the kind and amount of lime and fertilizer needed on each field, is through using soil tests as the guide. The P_2O_5 mentioned is in processed material, he says, but that in no way minimizes the use of rock phosphate in providing the basic phosphate needs. "However, in addition to 1,000 to 1,500 lb. rock phosphate an acre on low phosphate soils, we would use 30 to 40 lb. P_2O_5 in processed phosphate in a starter fertilizer with new seedings.

"The second phase is that of maintaining a productive and vigorous stand after establishment. Numerous demonstrations conducted by county extension agents in Missouri since 1955 have very definitely shown that surface applied treatments in either early spring or late summer (mid-August to mid-September) have contributed tremendously to increased production. We recognize that nitrogen is very effective almost immediately for increased productiveness provided there is a satisfactory lime, phosphate and potash situation. Most of the Missouri pastures receiving surface treatments gave tremendous response from complete fertilizer applications consisting of nitrogen, phosphate and potash. Many instances have been observed where nitrogen alone has caused a decrease in productiveness on low mineral fertility soils. This is especially true where nitrogen alone is used more than once.

"The demonstrations conducted in South Central Missouri and in Northwest Missouri had applications of 60 lb. of N, and 60 lb. each of N, P_2O_5 and K_2O. More recent demonstrations have had applications of 90 lb. of N and 90 lb. each of the other two primary plant foods.

"In a nutshell, recommendations for fall fertilizer applications to established pastures would consist of the use of 60 to 120 lb. or more of N, P_2O_5 and K_2O an acre. The nitrogen would be varied according to the need for pasture. In other words, use N according to the need for additional livestock carrying capacity.

The need for P_2O_5 and K_2O should be determined with soil tests. On high phosphate and/or potash soils, some but in lesser amounts would be recommended. Nitrogen alone, one year, would be profitable on a fair to good stand of grass with a medium mineral fertility level in the soil.

"One demonstration's results is as follows, which is typical of the response being made to more liberal nitrogen, phosphate and potash applications to already established grass-legume mixture. Harvest was made one time so far and in about 60 days after treatments were applied."

Treatment	Green Weight, per A.	Dry Weight, per A.
No Treatment	6,500	1,750
90+90+90	18,000	4,750
90+0+0	10,000	2,250

IOWA

J. A. Stritzel, extension agronomist of Iowa State College, Ames, says that pasture improvement work may be thought of in a number of categories. "The first would be a simple top dressing of nitrogen or a nitrogen-phosphate combination, depending on soil tests of established blue grass pastures.

"The second approach would be that of improving a permanent bluegrass pasture. Such improvement would include the steps of soil sampling during the summer to test the soil to determine the nutrient needs. Once this has been done, the lime and fertilizer may be applied in the early fall and the sod plowed. This fertilization application could be delayed until spring and then worked into the plowed ground ahead of seeding time.

Iowa State College says that established one-year-old legume stands can be topdressed profitably if a good stand is present and a need for the topdressed nutrient exists.

Nutrients needed for legumes will be either phosphate or potash, or both. The college says that topdressing should be done in the spring, preferably just as growth is beginning or immediately after the first cutting. Topdressing can also be done in the early fall to improve growth of weak stands.

In the case of grass crops, however, the primary need is nitrogen rather than phosphate and potash as is the case in legumes which fix their own nitrogen. It should be remembered that phosphate applications are also important with grasses if the soil is very low in available phosphorus. The topdressing of nitrogen (or phosphate if needed) should be done in the spring just as growth is beginning or in the early fall while the plants are still growing.

For bluegrass pastures, nitrogen is again the necessary nutrient. Topdress the nitrogen early in the spring or fall, the college says.

NORTH DAKOTA

Jack F. Carter, associate agronomist at the North Dakota Agricultural Experiment Station says that there are approximately 300,000 acres of tame grass hay in the state (probably primarily bromegrass and crested weed grass) and approximately 300,000 acres of tame grass pasture in North Dakota whose production probably could be increased by nitrogen fertilization.

Adequate nitrogen fertilization of these pure grasses, followed by average spring rainfall, should double their forage production or effectively double the tame pasture acreage. This would result in an increase of forage worth $12 million at 20 dollars a ton for good grass hay. If one can assume that 200,000 of these forage acres are old pure bromegrass stands in a tier of 13 eastern North Dakota counties where good stands of fertilized pure bromegrass on productive soils could and should produce 2 and ½ to 3 tons of forage an acre, the possible potential increased forage production would be another 200,000 tons.

Experiments over the period from 1951 to 1953 showed that the application of 100 lb. nitrogen an acre brought about significant increases in a number of varieties of hay.

Fertilizer recommendations include 100 lb. nitrogen an acre on old "sod-bound" stands of bromegrass or other pure grasses as the best treatment for increased forage production at present on a cost return basis.

Maximum response to nitrogen fertilization depends upon available soil moisture, although a favorable response was obtained at Fargo in 1952 despite very low rainfall in April, May and June.

Fertilized pastures will be ready for grazing earlier in the spring and produce forage later in the summer than unfertilized pastures. Nitrogen fertilization of old grass stands produced a greater proportional positive response in seed production than in foliage production. The seed production of fertilized plots (133 lb. nitrogen) over unfertilized was 8.68 times in crested weed grass, 54 times in Lincoln Bromegrass, and 19.6 times in Russian Wild Rye. The application of nitrogen for seed production was very profitable.

Response to phosphorus fertilization was erratic in the grass species the station reports. Phosphorus alone gave no response in the form of increased forage or seed yields over unfertilized spots. Superphosphate, with 100 lb. nitrogen an acre, gave increased forage and seed yields over that produced using 100 lb. nitrogen an acre only. The station concluded "nitrogen fertilization of pure grasses makes dollars and sense economically."

KANSAS

The Kansas experiment station at Manhattan states that liberal use of nitrogen on grass sods exhibiting nitrogen deficiency has proved practical in central and eastern Kansas and under irrigation in western Kansas. A seed crop normally gives a better financial return from nitrogen fertilization than a forage crop. However

The Farmer's Best Defense Against Blight

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good livestock management can make fertilizers pay dividends by careful use of the extra forage produced. When forage alone is desired, a mixture of grass and alfalfa may give total yields approximately equal to grass alone, but moderately fertilized. Even with mixtures of grass and alfalfa, nitrogen gives a profitable increase, especially with older stands.

From 60 to 100 lb. nitrogen an acre should be applied on old sods. This means 200 to 300 lb. ammonium nitrate or its equivalent an acre; 100 lb. ammonium nitrate will help but usually will not result in good seed production.

Using nitrogen and phosphorus is a good practice in establishing grass. About 150 to 200 lb. of 10-20-0 or 16-20-0 fertilizer usually will suffice.

Phosphatic fertilizers on old stands of cultivated grasses ordinarily are not necessary. However, on soils especially low in available phosphorus, cultivated grasses may benefit by a top dressing of both superphosphate and nitrogen. Mixtures of grasses and legumes may need phosphorus. Phosphatic fertilizers encourage legumes in a pasture or in a meadow mixture. Annual applications of 30 to 40 pounds per acre of available phosphoric anhydride (P_2O_5) should be sufficient for such purposes. Most mixed fertilizers do not supply enough nitrogen in proportion to phosphorus for grasses. Mixed fertilizers used on grasses should be supplemented with additional nitrogen.

Forty pounds an acre of available phosphoric anhydride (P_2O_5) is recommended for lespedeza, seeded alone or with small grains. Lespedeza is not so efficient in using rock phosphate as are alfalfa, sweetclover or red clover. Therefore, greater emphasis is placed on superphosphate for lespedeza unless the crop is in rotation with alfalfa, sweetclover, or red clover, all fertilized with rock phosphate.

Lespedeza in extreme southeastern Kansas counties may need potassium. Where potassium is needed, 200 lb. an acre of a 0-20-20 fertilizer mix is recommended.

Nitrogen may be needed for small grain nurse crops. It should be applied at the rate of 20 to 40 lb. an acre, either straight or as part of a mixed fertilizer.

Principles underlying successful use of fertilizers on red clover and sweetclover are the same as for alfalfa. Two hundred pounds of 20% superphosphate, 90 lb. triple superphosphate, or 1,000 lb. rock phosphate an acre are recommended at seeding time. The 1,000 lb. rock phosphate are expected to influence favorably two to four crops of nonlegumes following the legumes.

Where potassium is needed in southeastern Kansas, it should be supplied in the form of a mixed fertilizer; 200 lb. an acre of 0-20-20 is recommended.

NEBRASKA

Agronomists at the University of Nebraska say that fall applications of nitrogen on bromegrass and other cool season grasses can result in higher yields and better quality forage. The nutrient should be applied at the rate of 60 to 120 lb. available nitrogen an acre.

The station advises that best results are obtained if half of this rate is applied in the late fall and the remainder early in June. From 60 to 80 lb. available nitrogen is adequate for bromegrass seed production and should be applied in the late fall.

Phosphate fertilizer often is needed for top production of an alfalfa-bromegrass combination. Where phosphate is needed for the alfalfa, phosphate fertilizer should be applied at the time the grass-legume mixture is seeded, it is pointed out.

If the phosphate was not applied at seeding time, good results can be obtained by broadcasting the phosphate on established stand in the late fall. The amount of available phosphate to apply should depend on soil test recomendations.

The Nebraska station reports that experiments indicate that larger seed yields were obtained from fall than from spring applications of 120 lb. nitrogen. For the most part, the fall applications were more effective than the spring applications for increasing the yields of hay. However, larger yields of protein were obtained from the spring applications of nitrogen. "It seems likely, therefore, that a split application of nitrogen might take advantage of the favorable effect of fall applications on the yield of seed and hay and of the favorable effect of the spring applications on the protein content of the hay," a station bulletin points out.

MINNESOTA TOUR

(Continued from page 9)

which fertilizer has been applied in accordance to the needs indicated by soil tests.

The farmer told the group that the program is more than paying off, with his having already had sixteen days of grazing for his herd by June 30, and also that the milk production from these cattle is more than twice the amount received from the cows on a check plot. The fertilized area yielded some 3,000 lb. milk an acre as compared to 1,200 lb. an acre from the unfertilized area.

Mr. Oraskovich emphasized the economy involved in having more than twice as many grazing days from the fertilized pasture, pointing out that the well-fertilized areas are ready for grazing much sooner and continue to serve much longer than those low in fertility.

Somewhat the same story was told by another Carlton county farmer, Maurice Hedberg, who exclaimed that he was "amazed" at the results noted in the way his pasture responded to the treatment. "I just wouldn't have believed it if I had not seen it with my own eyes," he told the group assembled in his pasture. He said that the milk return from the fertilized two acres was double the amount from the check plot of the same size, and opined that the most significant gains are yet to come when the fertilized plot continues to produce later in the season after the check area becomes unable to support cattle.

Mr. Hedberg stated that his fertilizer program had included 200 lb. nitrogen put on in 50 lb. applications in the fall, in the spring, as a top-dressing and later in the summer. In addition, 85 lb. P_2O_5 and 160 lb. K_2O were also applied in the spring.

Representatives of the University of Minnesota and the industry were present on the trip, plus interested local people who joined the tour briefly at different points.

South Carolina Sales

CLEMSON, S.C. — South Carolina fertilizer sales during May totaled 72,526 tons, compared with 88,324 tons in May, 1956, according to the South Carolina Department of Fertilizer Inspection and Analysis. Sales for the first 11 months (July-May) of this fiscal year totaled 788,025 tons, a decrease of about 5% from 830,355 tons in a comparable period a year earlier.

FARM POND TREATMENT

LEXINGTON, KY. — Farm ponds, which may contain poison algae, can be harmful to livestock, according to James Herron, Kentucky extension botanist. Mr. Herron pointed out that farm ponds with a distinct bluish-green tinge may contain the algae and recommended treating with copper sulfate at the rate of 8 lb. per million gallons of water. The extension service has issued Leaflet 191 on the subject.

High Water Solubility In Phosphate Boosts Wheat Growth in Tests

MORRIS, MINN.—Higher water solubility in phosphate fertilizers is increasing growth in wheat in field trials, Merle Halvorson, soils research worker at the University of Minnesota, told a recent Visitors' Day gathering at the university's West Central School and Experiment Station here.

The experiments were conducted in cooperation with Roy Thompson, station agronomist and A. C. Caldwell, university soil scientists. Mr. Halvorson said that when fertilized with phosphate which was 85-90% water-soluble, wheat had grown to 15-20% height and was 2-3 days farther along in maturity than wheat receiving low-solubility phosphate.

He added that these results are only tentative and final conclusions will be made after the crop is harvested later this summer.

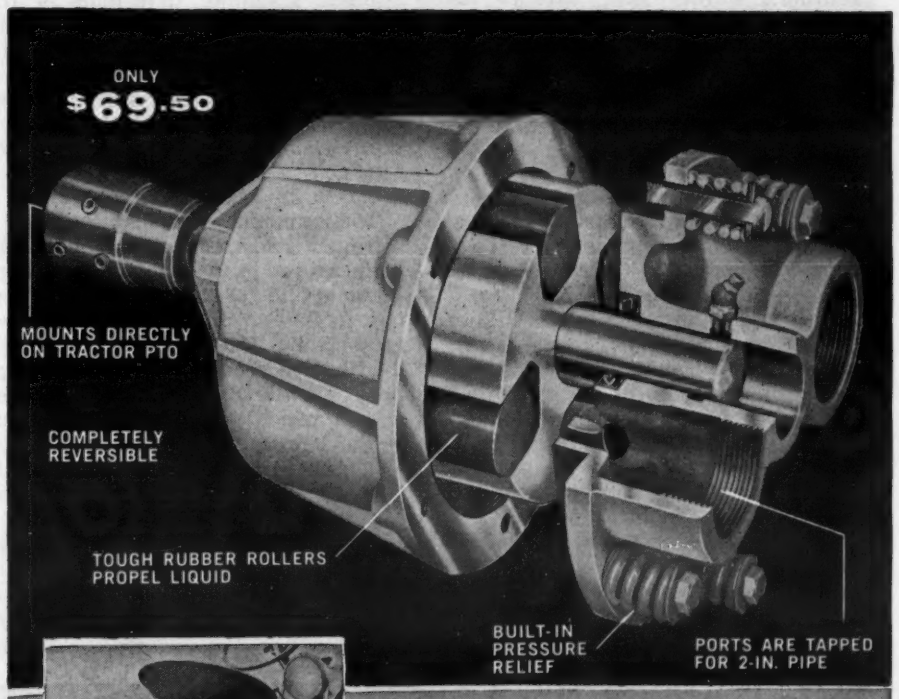
These trials are set up to test the effect of phosphate solubility on wheat and corn growth in the high-lime soils of western Minnesota. Phosphate solubility percentages being tested are 0-3, 18-20, 40-45, 60-65 and 85-90%. It's too early to note any differences in corn growth from the solubility differences.

In wheat, the fertilizer is being tested at three different rates—6, 12 and 18 lb. of phosphate per acre—and was applied with wheat in the drill row. The phosphate fertilizer was "tagged" with radioactive isotopes.

NEW COURSE

BERKELEY, CAL.—The College of Agriculture at the University of California at Davis will add a new field of study to the curriculum this fall—plant nematology. A course in general plant nematology—the classification, morphology, biology and control of nematodes attacking cultivated crops—will be taught for the first time on the Davis campus.

BIG NEW HYPRO PUMP for direct tractor drive



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HYPRO PUMPS

EDWARD H. TYNER

(Continued from page 9)

of it may be converted to leachable form. The temperature of 50° to 55° F., therefore, is a compromise.

The date on which the soil reaches a temperature of 55° F. will vary from year to year depending on latitude, air temperature, direction of slope, etc. It is therefore best to measure the temperature of the soil before applying nitrogen.

Temperatures decline more slowly at the soil surface than at depths of 4 to 12 inches. In general, the temperature reaches 55° F. at a depth of 1 inch about two weeks later than at 4 to 12 inches. Thus nonleachable nitrogen that is applied to the soil surface, when the soil temperature is 55° F. at the 4-inch depth, will nitrify more rapidly, provided moisture is favorable for microbial growth, than nonleachable nitrogen that is plowed under.

Water is the chief means of moving nitrate nitrogen through and out of the soil. Any soil characteristic that impedes or retards the free flow of water through the soil profile therefore reduces drainage losses of nitrate nitrogen.

On soils having tight clay subsoils with very low permeability, nitrogen can be applied in the fall, regardless of type of carrier or soil temperature, without serious loss through drainage. Cisne and related soil types in southern Illinois and Clarence and related types in east-central Illinois are good examples. Applying nitrogen for wheat on Cisne soils in the fall would make it unnecessary to apply it in the spring when the soil is excessively wet and soft.

On medium-heavy to heavy-textured soils with permeable subsoils having good internal drainage, however, only nonleachable carriers should be applied in the fall when soil temperatures are below 55° F.

Fall and winter rainfall in Illinois is sufficient, as a rule, to more than replace subsoil moisture reserves depleted during the growing season. On permeable soils the excess moisture either drains away in tiles or is added to ground water reserves. It is this excess moisture that contributes to nitrate drainage losses.

The amount of rain needed to initiate tile flow will vary with soil texture. An equal amount of rainfall will penetrate deeper in soils with sandy profiles than in soils with heavy clay subsoils. We can therefore expect more nitrate loss through leaching on sandy soils than on the heavier soils.

On sandy soils nonleachable nitrogen can be applied in the fall for winter grains. For corn, however, sidedressing is preferable to plowing under either fall or early spring applications, because spring-formed nitrates may leach considerably before the corn roots develop.

In the normally drier areas of the Midwest, fall and winter rains seldom soak deeper than 4 feet into the soil. Thus no leaching beyond root penetration occurs and even nitrate-containing carriers may be fall-applied.

For the past two winters the subsoil has been dry in certain parts of Illinois. This dryness may account for the reported success of fall applications of nitrate-containing carriers. The fact that no water has discharged through tiles for many months is not normal. Nitrogen applications made in the fall on permeable, well-drained soils should therefore be confined primarily to nonleachable carriers.

Investigations show that drainage loss of a soluble nutrient is related to the amount of that nutrient in the soil. The loss of nitrate nitrogen will therefore vary with the total amount applied, assuming that none of the nonleachable nitrogen is converted to nitrate nitrogen. Because of the difference in nitrate content, we can expect the loss to be greater when nitrate of soda is applied in the fall than when an equivalent amount of nitrogen, as ammonium nitrate or Solution 32, is applied (see Table 1).

The economic loss sustained when nitrogen is lost through leaching can be measured in two ways: First, there is the actual cost of the nitrogen that is lost. Second, there is the increased crop value that the lost nitrogen might have produced. With small applications the loss is not great regardless of which yardstick you use. But if the leaching loss runs as high as 25 lb. an acre, the loss in crop value may be three times the cost of the nitrogen that leaches out.

Plant roots are effective in reducing nitrogen leaching losses. Lysimeter data show that less nitrogen is lost from cropped soils than from adjacent areas where the soil is fallowed. Almost no nitrogen drainage occurs where continuous grass sods are maintained. On the other hand, losses where row crops have been harvested may be fairly large. Thus the kind of crop that is grown has an effect on the amount of nitrogen lost through drainage.

The superiority of grass sods over intertilled annual crops in reducing drainage losses is probably related to the greater density of the grass root system and the longer season over which grass roots actively absorb nitrogen.

Nitrogen (even carriers that supply nitrate nitrogen) can be applied in the fall on grass sods without serious leaching loss provided the grass is growing actively. But when grass is winter dormant the root system no longer absorbs nitrate nitrogen effectively, and nonleachable carriers are preferable.

Legume roots are also effective in absorbing nitrate nitrogen. But applying nitrogen to sods that are predominantly legumes decreases the ability of the legumes to fix nitrogen. If nitrogen is to be applied to legume sods, it should be done after the legume is winter dormant. Leaching losses of nitrate nitrogen due to normal decay can also be minimized by delaying fall plowing of legume stands until mid-September or later.

Competition between microbes and nonleguminous crops for available nitrogen when residues with wide C:N ratios are plowed under can be eliminated by applying commercial nitrogen. In the process of decay, the commercial nitrogen is converted to nonleachable organic nitrogen.

When temperature and moisture are favorable, organic nitrogen forms undergo further microbial decay and release available nitrogen. Applications of commercial nitrogen to highly carbonaceous residues must be timed in such a way that microbial activity will tie up the nitrogen and not release it until the following season.

Since microbes cause decay, it is obvious that soil temperatures must be favorable for microbial activity. Otherwise no tie-up of nitrogen can take place. If soil temperatures are favorable for microbial growth, as much as 30 lb. of nitrogen can be applied per ton of highly carbonaceous residues.

The importance of temperature in this microbial tie-up of commercial nitrogen raises a question about the practice of applying nitrogen to cornstalks in the fall for the express purpose of hastening decay. There is relatively little microbial activity at the time of corn harvest. This being the case, but little nitrate or ammonium nitrogen can be converted into organic forms before winter. If nitrate carriers are used, leaching losses may occur.

On the other hand, nonleachable forms will remain in the soil and the decay process will be completed in the spring when temperatures are again favorable for microbial growth.

Legume residues with narrow C:N ratios contain enough nitrogen for rapid decay. Where nitrogen is to be applied in the fall on legume sods, nonleachable types are to be preferred.

The practice of applying nitrogen to cornfields that are to be planted to soybeans for the purpose of rotting the residues should be discouraged. Soybeans, if properly nodulated, can fix all the nitrogen they need. Although applying nitrogen to cornstalks before soybeans are planted does hasten decay, it also reduces the ability of the soybeans to fix nitrogen.

Applying nitrogen under these circumstancse is equivalent to applying it to the beans themselves, a practice that is not generally recommended in Illinois. Furthermore, it may cause excessive vegetative growth at the expense of yield.

Better Practices Boost Legume Seed Output In Minnesota Trials

ST. PAUL — Honey bees, fertilizer and insecticides—those are the ingredients needed to spell success in legume seed production.

That's the conclusion of a group of University of Minnesota scientists after years of experimental field work in northern Minnesota. They are F. G. Holdaway, A. G. Peterson, K. W. Tucker and B. A. Haws, entomologists, and P. M. Burson and H. W. Kramer, soils research men.

They have found that poor pollination, lack of phosphate and potash nutrients in the soil and harmful insects have been responsible for low seed yields in alsike clover, red clover, alfalfa and sweetclover—Minnesota's main forage legume seed crops.

In carefully controlled field trials, the scientists compared different honey bee stocking rates, fertilizer treatments and insect control with no control, no bees and no fertilizer. Wild bees, they concluded, couldn't be depended upon for pollinating the crop. So it's necessary to stock the fields with honey bees.

With alsike clover, for example, where there were no honey bees for pollination, no insect control and no fertilizer used, yields averaged 15-20 lb. per acre. But with honey bees nearby, 1,000 lb. of a phosphate-potash fertilizer added and 1½-2 lb. of DDT sprayed on each acre, alsike yields went up to 800 lb. per acre.

Results were similar in other seed crops. Sweetclover averaged 6 lb. per acre when none of the three practices was used. Pollinated sweetclover that received no fertilizer or insect control yielded 1,078 lb. per acre and where all three practices were followed, yield was 1,438 lb. from each acre.

New Retail Firm

SAN RAFAEL, CAL.—Bob Herman Garden Supplies is the name of a new retailer of fertilizers and agricultural chemicals, opened recently at 3825 Redwood Highway in San Rafael. Partners in the enterprise are Bob Herman and Larry Zuur, both formerly retailers in other fields.

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FARM SERVICE DATA

Pasture Maintenance Tips To Boost Off-Season Sales

Midwestern agronomists report at a good fertilizer top-dressing will lp legume-grass meadows make a ster recovery after the first cutting hay. This means that the meadows ll get back into production faster. can mean more hay per acre, low- feeding costs for dairy and beef rds and higher profits per animal r acre.

Minnesota extension soils special- s say that fertilizer makes alfalfa d other legumes live longer. Big nounts of phosphate and potash are ed by legume-grass meadows, so it important to use a fertilizer top- ssing that contains these nutri- nts.

The Minnesota specialists advise sting the soil before applying the rtilizer to find out just how much hosphate and potash the soil needs. general, they advise applying 300 more pounds per acre of phos- nate-potash fertilizer such as 0-20-20, its equivalent.

Dr. J. M. MacGregor, Minnesota esearch soils specialist, reports that hosphate-potash fertilizer has in- reased alfalfa yield and produced rops with a higher percentage of rotein than crops that received no rtilizer.

★

Alfalfa is a heavy feeder on soil nu- rients such as phosphorus and po- assium. A 2-ton crop of alfalfa, for xample, contains 20 lb. of phos- horus and 115 lb. of potassium. Be- ause of this it is a good practice to op dress established stands of alfafla ith fertilizer. This can be done in he fall, early spring or immediately fter taking off a crop, according to ansas State College.

Kansas soils are generally low in hosphorus, according to Robert A. ohannon, extension specialist in soil esting at the college. To maintain igorous stands of alfalfa it is neces- ary to apply phosphatic fertilizer to eplace that removed by the crop. Superphosphate," Mr. Bohannon aid, "may be used successfully any- here in Kansas where phosphorus is eeded. The equivalent of from 20 to 0 lb. per acre of available phosphoric cid is a good annual application on stablished stands of alfalfa."

★

Pasture-building practices that cut eeding costs to the bone can put more dollars in the pockets of dairy- men, according to F. V. Burcalow, University of Wisconsin agronomist.

Mr. Burcalow points out that feed costs represent 50 to 60 cents out of every milk production dollar. By im- proving pasture production and han- dling forage to reduce losses in har- vesting, he says, farmers can make big savings on their feed bills. He fig- ures that good pasture can be pro- duced for about one-third the cost of corn and other grains.

As much as 5,000 lb. per acre of total digestible nutrients were produced by one dairyman in the 1956 Wisconsin Grassland Farming program, he reports. This is equal to 100 bu. of corn, more than 200 bu. of oats, or five tons of high quality hay.

Mr. Burcalow says the goals of this program are to produce high quality pasture, hay, grass silage or green feeding. Good pasture depends on good soil fertility so that the fields can support high yields of legumes and grasses.

★

In the case of introduced grasses in high or rainfall areas, Oklahoma A&M agronomists are finding a well- planned fertilizer program paying well.

Oklahoma A&M research in south- eastern Oklahoma where the soils have a low fertility content shows that pastures can vary in productoin as much as 92 lb. of beef per acre.

For the last six years fertilized pastures have averaged 276 lb. of beef an acre whereas only 184 lb. of beef were produced on nonfertilized, bermuda grass-legume pasture.

The fertilized pastures received 200 lb. of 0-20-0 and 33 lb. of muriate of potash annually.

Oklahoma agronomists credited the six-year average increase of 90 lb. of beef per acre in favor of the fertilized pasture to the high carrying capacity. A higher daily gain in the spring months was thought to be due to a lush clover growth.

★

Midwestern agronomists suggest two ways to help new meadow seedings make fast, thick growth after the small grain harvest is out of the way:

1. Clip and remove all straw from wheat fields after the crop is combined, except where the seeding is made up of sweet clover. Taking the straw out of the field, makes room for sunshine and air to reach alfalfa, red clover, Ladino and pasture grasses.

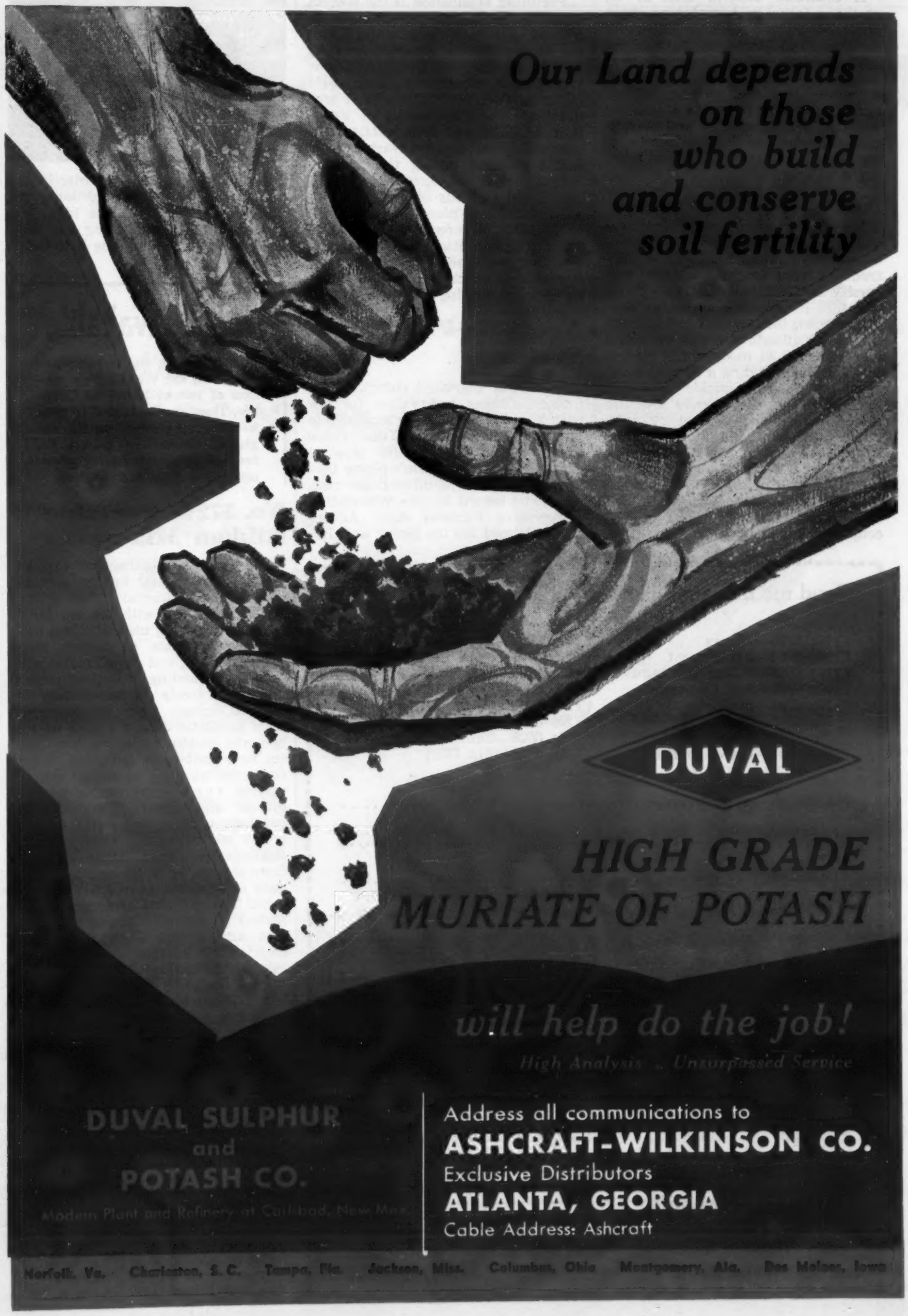
2. Give the new seeding a top-dressing of fertilizer high in phosphate and potash. This will supply the small legume plants with plant food needed to develop strong roots and healthy top growth.

Ohio agronomists report that hay yields were boosted an average of 1,630 lb. per acre in three-year tests, when the field was mowed and all the straw was removed. Mowing the field a second time in late August and removing all the straw resulted in a yield increase of 1,810 lb.

★

In the first year of an experiment at the Kansas State College Colby Branch Experiment Station, pigweeds removed all the available moisture from the surface foot of soil by the time they were 12 to 14 inches high. By this time there were about nine pigweeds per square foot. At this stage they had also used the major portion of the available moisture from the second foot.

Kochia used all the available moisture from the surface foot and a considerable amount from the second foot by the time they were eight inches high in stands of slightly more than 70 per square foot. Results indicate that kochia used the available moisture at a given depth more completely before drawing upon the supply at a deeper depth than did pigweed.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What's New...

In Products, Services, Literature

You will find it simple to obtain additional information about the new products, new services and new literature described in this department. Here's all you have to do: (1) Clip out the entire coupon and return address card in the lower outside corner of this page. (2) Circle the number of the item on which you desire more information. Fill in your name, your company's name and your address. (3) Fold the clip-out over double, with the return address portion on the outside. (4) Fasten the two edges together with a staple, cellophane tape or glue, whichever is handiest. (5) Drop in any mail box. That's all you do. We'll pay the postage. You can, of course, use your own envelope or paste the coupon on the back of a government postcard if you prefer.

No. 6608—Technical Bulletin

A technical bulletin (No. 5) on urethane (ethyl carbamate) has been prepared by the organic chemicals division, Food Machinery & Chemical Corp. According to the company's announcement, there is a "growing interest in urethane" in the field of agricultural chemicals (including weed killers, fungicides and insecticides). Secure the bulletin by checking No. 6608 on the coupon and mailing it to Croplife.

No. 6609—Ant Film

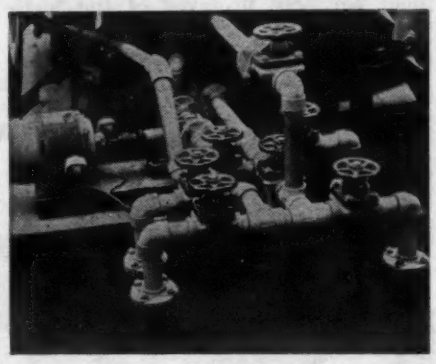
Insecticide formulators, distributors and dealers can now obtain copies of a new color-sound film on ant control, prepared recently by the University of Georgia extension service. The film is described as being "noncommercial, interesting, and authentic, and it affords a means for training personnel in modern ant control methods, or providing a factual background for ant insecticide sales promotions." The film covers the life cycle, habits, and control of ants. Copies are available in black and white as well as color and it has been cleared for TV use. The running time is 13½ min. Copies of film may be obtained on a free, loan basis. For full details check No. 6609 on the coupon and mail it to Croplife.

No. 6602—Fertilizer Bulletins

Fertilizer application is the subject of three new farm service bulletins offered to agents, dealers and farmers in the Middle Atlantic area by the I. P. Thomas Division of the Pennsalt Chemicals Corp. "Side Dressing Fertilizer," "Rotation Fertilization," and "Economics of Fertilizer Applications" give detailed recommendations on the various elements required during the growing season, types of commercial fertilizers, and methods of application to supply sufficient plant food for profitable yields. A reference table shows average composition of 39 common fertilizer materials. The bulletins are available by checking No. 6602 on the coupon and mailing it to Croplife.

No. 6607—Piping Systems

Details of polyvinyl chloride pipe, fittings, flanges and valves for use with liquid fertilizers are available in literature prepared by Tube Turns Plastics, Inc. The picture gives a close up view of the firm's piping that serves one of the liquid fertilizer mixing tanks owned by the Washington Cooperative Farmers Assn. Advantages claimed for the piping are: Re-



sists the attack of corrodents; is unaffected by weather conditions; requires no paint; and has long life. Secure details by checking No. 6607 on the coupon and mailing it to Croplife.

Also Available

The following items have appeared in the What's New section of recent issues of Croplife. They are reprinted to help keep retail dealers on the regional circulation plan informed of new industry products, literature and services.

No. 5726—Portable Ribbon Mixers

The Young Machinery Co. announces that a new line of portable heavy duty horizontal ribbon mixers is in production with .34 cu. ft. to 20 cu. ft. working capacity. The mixers are available in carbon steel, stainless steel, and monel metal with or without heating or cooling jackets and move freely on heavy duty industrial casters. They are furnished with single or double ribbon or ribbon and paddle agitators. The mixers have dust-tight, gasketed, hinged cover with quick opening clamps, marine type compression packing glands and anti-friction outboard bearings with sealed roller bearing pillow blocks — one fixed and one floating. Discharge is made either from the center or the end by a slide gate or a worm gear operated plug gate. The portable mixers are furnished as complete units with motors and drives. They are recommended for mixing dry, free flowing powders or granular materials. Secure complete details by checking No. 5726 on the coupon and mailing it to this publication.

No. 5733—Sewing Head Attachment

A new sewing head attachment has been announced by the Union Bag-Camp Paper Corp. Called the I & C Acto-Cutter, this attachment automatically starts and stops the sewing head and also cuts the thread chain between bags, company officials said. They continued: "Field experience shows that the use of the Acto-Cutter reduces the human element in sewing to a point where an inexperienced operator may be used. The attachment also makes it possible for one operator to easily perform the combined operation of carefully forming the bag tops and the feeding the bags into the sewing head. Another advantage is that it reduces torn, unsightly and irregular sewn closures to a minimum. Designed for use on the Union Special 80600E sewing head, the unit is available in two basic models. Secure details by checking No. 5733 on the coupon and mailing it to this publication.

No. 6588—Sulfur Brochure

The Stauffer Chemical Co. has published a comprehensive 48-page brochure on sulfur. The brochure contains a description of production and refining techniques, statistics on the world's production of sulfur, and notes on the various uses of the material. It also includes specifications for the several types of conventional and insoluble sulfurs used in industry and agriculture, and tabulations of the physical and chemical properties of sulfur in its different forms. A copy of the brochure, "Stauffer Sulfurs," is available free on request. Check No. 6588 on the coupon and mail it to Croplife.

No. 6593—Soil Fumigant

A new folder explaining how to use Crag Mylone is now available from Union Carbide Chemicals Co., Division of Union Carbide Corp. Mylone is a new, powdered soil fumigant that is said to need no plastic cover. It acts as a herbicide, soil fungicide, and nematocide in pre-planting treatments on a variety of ornamentals. It is now commercially available as a pre-planting treatment on ornamental propagating beds. Experimental use of the product is continuing in many different states on tobacco, vegetable, and forest-tree seed beds and on turf. Formulated as an 85% wettable powder, Mylone can be applied dry with a fertilizer spreader or suspended in water as a drench or spray. Experimental dosages that gave most satisfactory results range from 100 to 300 lb. per acre, company officials said. Secure the folder by checking No. 6593 on the coupon and mailing it to Croplife.

No. 6594—Vermiculite Folder

A folder entitled, "Granular Formulations with Vermiculite" has been issued by the Vermiculite Institute. The folder covers the preparation of granular insecticides, herbicides and fungicides with vermiculite as the carrier. Hints on handling and formulating specific products are included. Properties and advantages of using vermiculite are described in the folder. Secure the folder by checking No. 6594 on the coupon and mailing it to Croplife.

No. 6595—Products Catalog

A 12-page products catalogue and informational booklet has been issued by the American Potash & Chemical Corp. The catalogue includes a description, properties and applications of nearly 70 chemicals marketed under the company's Trona trademark. Among major product groups included in the booklet are agricultural chemicals, boron chemicals, soda products, potassium compounds, bromines, lithium products, electrochemicals and refrigerants. A copy of the booklet will be sent without charge if you will check No. 6595 on the coupon and mail it to Croplife.

No. 6597—Lawn, Garden Guide

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☐ No. 6594—Folder	☐ No. 6606—Cotton Miticide
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No. 6598—Insect Control

The Glenn Chemical Co. has an...ounced the production of Tabutrex, ... chemical which acts as a barrier to ...ies, called a new approach to the ...sect control problem. The company ...ys the product has the approval of ...e U.S. Department of Agriculture. ...abutrex is an odorless and colorless ...quid that is claimed to be complete... ...y safe to use. Company officials said ...s properties prevent the fly from ...lighting on a dairy animal and there... ...ore the pest cannot bite or in any ...ay affect the well being of the ani...nal. The company has completed four ...ears of research and experiments on ...e product. For details check No. ...598 on the coupon and mail it to ...Croplife.

No. 6603—Technical Data Bulletin

Thiosemicarbazide, a reactive com...ound which behaves as a mono-acid ...ase and is a strong reducing agent, ...s described in a new technical data ...ulletin issued by the industrial ...hemicals division of the Olin Mathie...on Chemical Corp. The bulletin de...scribes the product's application in ...nsecticides, fungicides, antibacterial ...gents and stabilizers. The four-page ...ulletin gives information on physical ...nd chemical properties, typical re...ctions, uses, literature references, ...nd availability. Secure it by check...ing No. 6603 on the coupon and mail...ing it to Croplife.

No. 6604—Carrier for Liquid Toxicants

New literature has been prepared by the Minerals & Chemicals Corporation of America on its product, Attaclay, a carrier for liquid toxicants. Advantages claimed for the product are: Great sorptive capacity in high or low concentrations, with either viscous or "watery" poisons; produces dust bases, wettable powders that are dry, free-flowing, lump-free; and rapid, uniform impregnation. Secure the literature by checking No. 6604 on the coupon and mailing it to Croplife.

No. 6605—Fly Killer

African Pyrethrum Development, Inc., announces a fly killer for dairy barns that is "positive and economical but completely harmless to cows and to consumers of dairy products." The announcement was made following the establishment by official sources "that these qualities have been proven for formulations containing Pyrethrum (PYR), the natural flower-base insecticide, in combination with certain approved synergists, which extend and increase PYR's natural capabilities," according to officials of the organization. The synergized compounds are said to be equally effective in the form of sprays, fog, wettable powders or emulsions. A booklet is available without charge. Check No. 6605 on the coupon and mail it to Croplife.

No. 6606—Cotton Miticide

"Chipman 6199" is the product described in a technical service bulletin which has been issued by the Chipman Chemical Co., Inc. The product, formerly called "Tetram 75," and its recommendations for experimental use on cotton are outlined in the bulletin. The product is described as a fine granular, non-duty organic phosphorus compound which is readily soluble in water for spray application. It is claimed to kill spider mites and suppress aphids. Secure the bulletin by checking No. 6606 on the coupon and mailing it to Croplife.

Plans Set for North Central Weed Conference in Iowa

DES MOINES, IOWA—Officials of the North Central Weed Conference expect the fourteenth annual meeting and exhibit at Veterans Memorial Auditorium in Des Moines Dec. 10-12, 1957, to be the largest and most successful in the organization's history. Eighteen states and provinces are represented in the conference.

Plans for the event were announced by Loyd Van Patten, assistant state secretary of agriculture, Des Moines, exhibit chairman; and Dr. E. P. Sylwester of Iowa State College, Ames, who is chairman of local arrangements.

Approximately 150 exhibits of weed control chemicals and equipment, including new products and machinery, will be displayed in the main arena of the Auditorium from 8 a.m. to 5 p.m. daily. All exhibits, demonstrations and meetings of the three-day event will be held at the auditorium except the banquet, which will be held at Hotel Savery on the evening of Dec. 10.

Nationally-known authorities on weed and brush control will give talks and demonstrations on various phases of the problem. Sectional programs each morning and afternoon will cover weed control in industrial areas, field crops, pasture lands, turf and aquatic areas and horticultural crops. Extension and regulatory activities in weed control also will be discussed.

Conference officers are L. A. Derscheid of South Dakota State College, Brookings, chairman; F. W. Slife of Urbana, Ill., president; and Dwight Lambert of Lincoln, Neb., secretary-treasurer.

Program committeemen are: research, E. K. Alban of Ohio State University, Columbus; extension, John D. Furrer of the University of Nebraska, Lincoln; regulatory, Howard Richards of Madison, Wis., state weed supervisor.

Douglas P. Brush Joins Ferro Corp.

CLEVELAND, OHIO—Ferro Corp. has announced the appointment of Douglas P. Brush to the position of publicity specialist in its public relations department. He will report to John R. McCord, director-advertising and public relations.

Mr. Brush comes to Ferro from the public information department of the Cleveland Electric Illuminating Co. A native of Cleveland, he received his bachelor's degree from Miami University, Oxford, Ohio. He is a naval veteran.

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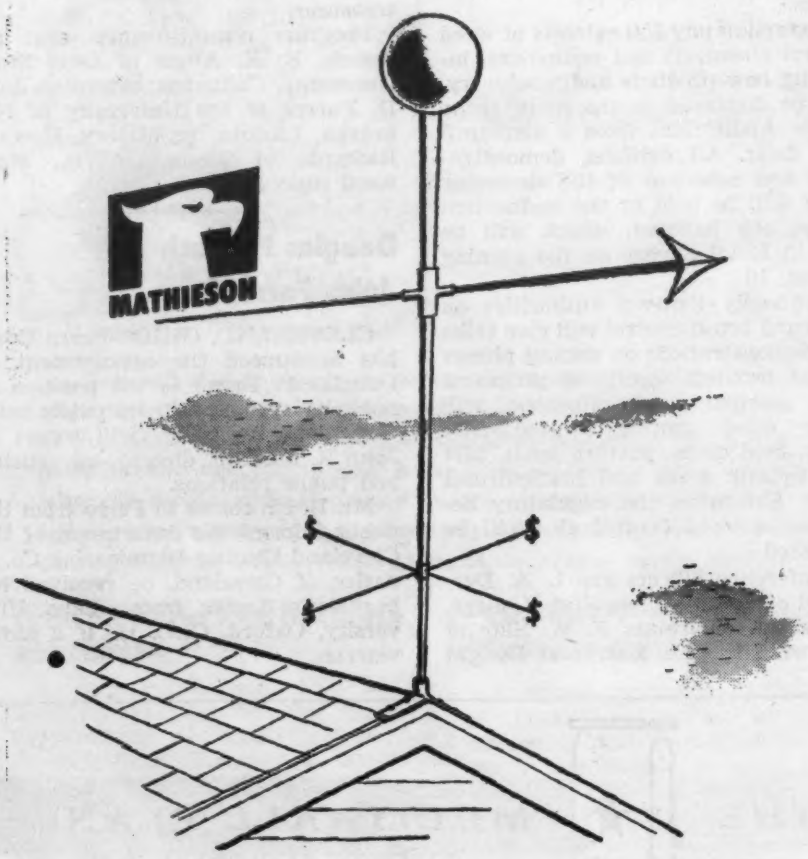

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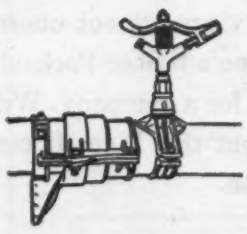

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CONSERVATION CONCEPT

(Continued from page 1)

and in the Southeast, where the agricultural economy is shifting from a one crop cotton economy to a livestock economy.

This major adjustment of the farm economy to a reduction of field crop acreage by as much as 50 million acres in 10 years goes somewhat farther than similar ideas long held by top land use economists. They believe that at least 35 million acres of worn out land should be retired from field crop production and that it should be rehabilitated through the use of tree crops and grassland agriculture. The former ideas were centered around the problems of the dust bowl and eroded land of the Southeast and into the southeastern area of the Delta.

U.S. Department of Agriculture soil bankers tell Croplife that they see the whole soil bank operation in a much broader concept than it is now understood. They believe that the soil bank can be made an effective part of a more balanced economy if they can cut back field crop production on small farms and later of larger farms to the extent of 50 million acres.

This concept is one of the introduction of a grassland farm economy in the lands where field crop production is at best little more than a gamble.

They are persuaded in their ideas that the transition to their target must be a cautious approach. They believe that they will eventually have to attract farmers on better and larger farms to add their land to the soil bank operation through higher payments for land retirement.

They also note carefully that in the long run it may be cheaper for the nation to buy the land from the farmers now operating than to engage in the soil bank program.

After these soil bankers had expressed their views on the bank's future, they went on to say that they could see no reason why development of good pasture or forage crops would not be a profitable adventure for the farmer, wherein through proper pasture fertilization he would accelerate the improvement of his land. They referred to the amounts of money which are available this year and next. Past experience shows that actually more money was being disbursed for approved conservation practices than was being paid out for crop acreage programs.

USDA soil bankers told Croplife that they had been criticized by segments of the fertilizer industry for the soil bank's having taken entire farms out of production. They admit that this condition exists, but they also feel that such complaints are somewhat short-sighted and that the long range goals will be dividend-paying instruments.

They cite a provision of the crop contracts to the effect that a contracting farmer in the Conservation Reserve Program of the soil bank must agree to establish and maintain his land under approved practices of the soil bank which are similar to those of Agricultural Conservation Program.

Subject to regional variations and patterns, soil bankers believe that a combined soil bank-ACP program financed to the tune of one billion dollars per year for the next 10 years will build an effective farm pasture backlog for a broader expansion of livestock production.

USDA officials say that the grassland concept, to which the long range program is geared, includes use of pasture crops for livestock. These officials do not expect a bid by livestock producers for a high price support concept for their industry.

These USDA officials believe that if there is a large amount of patience and cooperation, the livestock industry with lower gross profit levels may expand production at lower per unit profits, yet come up with a better net return on its investment than in the past feast and famine years.

Pasture land is the ace in the hole card for future farm programs. USDA soil bankers agree that they cannot and will not finally restrict pasture land developed under crop programs from livestock feedings.

USDA soil bankers say that they probably will have to increase payments for contributions of better land to the soil bank's Conservation Reserve Program.

For last year payments for this program amounted to approximately $8.50 an acre for about 6.75 million acres on contracts with farmers running from three to 10 years. USDA officials admit that such payments are on the low side and attract only the poorest land to the soil bank. Consequently the program has only limited effect on the reduction of the production of surplus field crops such as grains and cotton.

They say that the practical approach would be to take off as much land as possible at low level payments and to gradually step up such crop payments annually, so that they can eventually take out of field crop production some of the better land.

It all adds up to the conclusion that pastureland development and expansion of livestock will be the pay dirt in not too many years ahead. Now is the time to start thinking about pasture land.

As explained to Croplife by USDA Beltsville scientists, farming pasture land is not an overnight sensation. It cannot show the dramatic effects of corn land producing more than 100 bushels of corn an acre but on a well-managed farm where some thought is given to pasture and rotation crops, the good pasture land pays off in net profit dividends from end products of butterfat, more pounds of beef per animal and ultimately a better land build-up.

Strike Settled at National Potash Mine

NEW YORK—The strike which closed National Potash Co. Carlsbad, N.M. mine on June 3 has been settled. The firm last week stated that it would be several days before an adequate work force could again be assembled, and that an additional period would be required before the plant would be able to make any shipments.

Red-Banded Leaf Rollers Feed on Indiana Orchards

VINCENNES, IND. — Several instances of second-brood red-banded leaf roller larvae feeding on apples were noted at Vincennes up to July 16.

First-brood codling moth adults are still emerging in insectary cages but reached their peak prior to July 12. Moths are still active in orchards in enough numbers to warrant continued protection.

There was a second peak capture of third-brood oriental fruit moth adults in a lightly sprayed orchard near Decker, Indiana (Southern Knox County) between July 10 and 13, indicating that larvae will continue to enter unprotected fruit for the next 10 days.—D. W. Hamilton.

WEED BULLETIN

MANHATTAN, KANSAS—Kansas State College has published a new bulletin entitled "Controlling Weeds in Kansas." Authors are Z. W. Zahnley, emeritus agronomist, L. E. Anderson, and O. G. Russ, agronomists.

CANADA MEETING

(Continued from page 1)

Eastern Canada was produced in e five summer months from May to eptember when cows are usually on asture.

"In experiments done on 1,200 rms cooperating with the Ontario airy Herd Improvement Organiza- on," he said, "figures indicated that pproximately 35% of the cow's total nnual requirements of nutrition was erived from pasture.

"With good hay or grass silage for winter feeding, together with adequate summer grazing, it is quite possible to obtain 75% to 80% of the herd's total nutritional requirements. And frequently young growing stock obtain 100% of their requirements from forage crops."

Mr. Thomas said that pasture, plus mple forage of good quality for win- r feeding, provides lowest cost pro- uction of meat and milk. He con- luded by emphasizing the important ble fertilizers must play in maintain- g, and building, high producing anadian grasslands.

K. W. Neatby, director, Science ervice, Canada Department of Agri- ulture, Ottawa, the banquet speaker, ressed that the world's population growing rapidly . . . has doubled it- lf in the last 100 years . . . and that eding it is becoming a real problem.

"The present trend in humanity is nprecedented in human history," he id. However, while he urged atten- on to the problems at hand, Dr. eatby did not feel that the job was npossible. "Science, the farmer and dustry are making real progress in lving the need for an increased orld food supply," he said.

As examples, Dr. Neatby outlined e fine work science research had ne in improving hybrid corn. Crop otection was another field in which indicated science research had eatly assisted the farmer.

"As the result of much work in Ontario, the mean yield of crops, in general, was much greater in 1948 to 1952 than in 1933 to 1937," Dr. Neatby said. "The mean yield of oats increased by 30%, barley by 19%, potatoes by 164% and tobacco by 32%."

Dr. Neatby explained that science ad developed a similar situation in e U.S. where the mean corn yield, bushels per acre, had been in- reased from 21.6 bu. per acre in 1933 1937 to 39.2 bu. per acre in 1948 1952. While he felt improved vari- ties, better production methods and e weather had played an important art, he placed greatest emphasis on e role played by the increased sup- y and efficient use of plant nutri- nts in feeding the world crop.

"The production of plant nutrients as more than trebled in the last 15 ars," he said. "And if the problem feeding the rapidly growing world opulation is to be solved, the supply commercial fertilizer has an in- easingly important role to play."

S. J. Chagnon, assistant deputy inister of agriculture, Canada De- artment of Agriculture, Ottawa, saw e family-size farm as vital to Cana- 's future.

"Canadian agriculture presents a reater challenge and bigger oppor- unities for the efficient, family-size rm than ever before providing that e enterprising farmer is willing to odernize his farming methods," Mr. hagnon told the convention. Em- asizing the importance and great ed for modern farming methods, he ointed out that, in the coming ten ars, Canada will be short two mil- n head of cattle,—and is faced with e prospect of importing butter in o years. "We are already importing n million pounds of lamb every ar," he said.

Mr. Chagnon said he felt it was the sponsibility of Canadian agriculture feed her people, and feed them ell. He stated that the intelligent use of commercial plant foods was one of the best investments the Canadian farmer could make to help himself do a better and more efficient job.

"This is especially true in the case of pastures to produce animal and dairy products," he said. "Experiments prove that one dollar properly invested in plant food for the production of grass, returns three to five dollars in farm revenue. And plant food producers have products that help create more values and greater revenues in many of our present marginal and sub-marginal farms."

Mr. Chagnon felt that the plant food producers have a special responsibility in helping the farmer to use fertilizers to his best advantage. He commended the plant food producers for the educational work they are presently doing.

Major Grasshopper Control Program Completed in Utah

BRIGHAM CITY, UTAH—One of the major grasshopper control programs in Utah has been completed on 33,162 acres of range lands in Box Elder County, where a heavy infestation threatened complete loss of all forage on many areas near and adjacent to Sawtooth National Forest.

A cooperative control program sponsored by the federal government, state of Utah, Box Elder County and ranchers resulted in an excellent kill of hoppers on the acreage in the Rosette area in northwestern Box Elder County, said Dr. George F. Knowlton, extension entomologist, Utah State University.

H. F. Thornley, U.S. Department of Agriculture entomologist in Utah, supervised the control program.

The grasshopper population often exceeded 100 per square yard of range land prior to control. This was heavy enough to consume completely all forage produced, Mr. Thornley said.

The range infestation was one of the worst in the state this year, despite the fact that Box Elder and Cache County farms have infestations which are relatively heavy in places, Dr. Knowlton said.

ATTORNEY NAMED

PHILADELPHIA—William M. Epes has been appointed a senior patent attorney of Pennsalt Chemicals Corp., A. E. Lyden, patent department manager, has announced.

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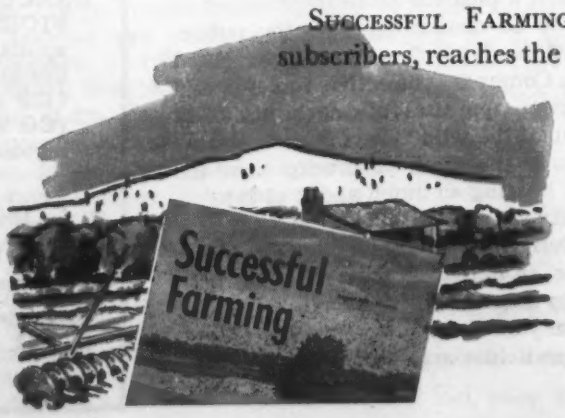

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A WEEKLY NEWSPAPER FOR THE FARM CHEMICAL INDUSTRY

The regional circulation of this issue is concentrated in the Midwestern states.

Miller Bill Author Declares Pesticides Safe

At the risk of appearing to use the "Congressional Record" as a source book for editorial texts, we wish to call to the attention of our readers a sequel to the editorial which appeared in Croplife June 24 wherein the remarks of Lee Metcalf (D., Mont.) were chronicled. Mr. Metcalf charged that the use of DDT and other insecticidal chemicals is a prime cause of cancer, heart disease and many other maladies of humankind.

Readers who uttered a hearty "amen" to the proposition that the pesticide trade needs some good strong rebuttals to the faddists, will be happy to know that the Congressional Record of July 12 carries some rather potent remarks from A. L. Miller (R., Neb.) author of the recently adopted (July 22, 1954) amendment to the Food and Drug Act, popularly known as the "Miller Bill."

Mr. Miller takes up the verbal cudgel against previous Record articles which were based on the assumption that very little is known about the effects of pesticide chemicals on humans and that the consumer is not now adequately protected against hazard from these chemicals in food production. "This is far from the truth," Mr. Miller declares.

"My amendment and other existing Federal legislation require thorough pretesting of pesticide chemicals and approval of both the U.S. Department of Agriculture and the Food and Drug Administration before they can be sold for use in food production," he said.

"The Food and Drug Administration also has been given the authority to seize all crops which bear unapproved levels of pesticide residues before the crops reach the market place," he continued.

We are glad that Mr. Miller reminded that the American Medical Assn. as well as the USDA, the Food and Drug Adminisration and the U.S. Public Health Service have recognized the effectiveness of this legislation in protecting the health of the public. This is a strong reply in itself, to those who attempt to picture the pesticide trade as being an irresponsible assembly of greedy individuals interested only in grabbing huge profits at the expense of public health. (They ought to see the "profit" SOME years!—Ed)

Dr. Bernard E. Conley, secretary of the committee on pesticides of the AMA, is quoted by Mr. Miller as follows:

"Pesticides play an important role in protecting the Nation's food supply and protecting the public health. Thanks to the Miller amendment to the Federal Food, Drug, and Cosmetic Act, the consumer is assured of an unparalleled degree of protection. The Miller amendment requires the pretesting of a pesticide chemical for the protection of the consumer."

Mr. Miller points out that nearly all the insinuations about unusual hazards associated with the use of DDT and other pesticides, are based on the charges made at one time or another by one Dr. Morton S. Biskind, New York physician who, since around 1949, has made broad assertions against pesticides in general and DDT in particular.

Although scare headlines and other anti-pesticide propaganda make more noise and commotion than does quiet scientific research, Mr. Miller states that "none of Dr. Biskind's charges have been substantiated by serious scientific research by the United States Public Health Service. Dr. Biskind's specific charges against DDT . . . have been disproved by extensive research on humans."

If Dr. Biskind's assertions were really true, the situation would probably be self-adjusting because it would appear doubtful that anyone who made, handled, sold, or used DDT would not be around long enough to hurt the public very greatly. According to Dr. Biskind, DDT contributed to infantile paralysis, heart disease, cancer, "X" disease of cattle, hoof-and-mouth disease, Newcastle disease of chickens and other maladies.

These allegations have been commented upon by a number of medical men, but few with more authority and scientific backing than Dr. Leonard A. Scheele, one-time Surgeon General of the U.S. Public Health Service. Dr. Scheele, writing in regard to the Biskind accusations, said that the charges have been carefully considered by toxicological experts of the Public Health Service. "In spite of continuous laboratory research on DDT in animals, and clinical study of cases of alleged 'poisoning' with DDT, our toxicologists have been, thus far, unable to substantiate Dr. Biskind's allegations," he states.

"Some of the diseases claimed by him to have increased in prevalence since the advent of DDT have, in fact, shown no increase. Others are now reported more frequently because of the changing distribution of age groups in our population—or because of procedural changes in morbidity reporting. Certain of the diseases of man and animals included in Dr. Biskind's list were well known long before DDT was introduced to this country and occur in places where DDT has never been used."

Dr. Scheele's comments, entered in the Congressional Record by Mr. Miller, should carry a considerable amount of weight on their own merits. But equally important, we think, are the further comments of Mr. Miller himself, who tells about a subsequent research project involving some 51 human volunteers who ate up to 200 times the average daily intake of DDT in the diet for a period of an entire year. The U.S. Public Health Service reported: "During the entire study no volunteer complained of any symptom or showed, by the tests used, any sign of illness that did not have an easily-recognized cause clearly unrelated to exposure to DDT . . . . the results indicate that a large safety factor is associated with DDT as it now occurs in the general diet," Mr. Miller declared.

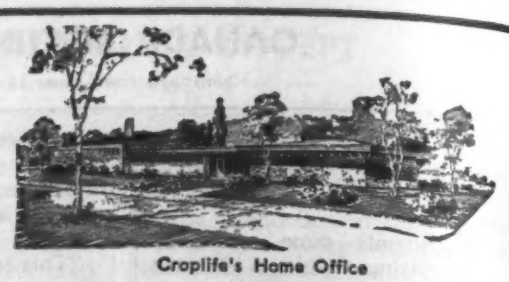
The anti-pesticide faddists who fear the possibility of ingesting microscopic portions of some toxicant, often fail to consider what the alternative is. They should listen for a minute to Mr. Miller who declares that pesticides protect foods from contamination by disease-carrying flies and rodents, by harmful worms, fungus, and bacteria which have been proven by centuries of human experience to cause many dreadful human diseases.

"The question is whether we want an inadequate food supply, many bearing worms and fly and rat droppings, or a minute residue of a chemical whose safety has been proved by years of research by industry, by the U.S. Department of Agriculture, by the Food and Drug Administration, and by the U.S. Public Health Service," he said.

"These agricultural chemicals are necessary to produce food. The Miller law makes it possible for growers to use these chemicals safely. This legislation provides safety for you and your family every time you eat."

Since our previous editorial appeared, we have received a number of comments from readers, all having in common a plea for more information of factual nature to be disseminated to the public. We believe that the type of argument presented by Mr. Miller in Congress is effective, forceful, and sincere. His calm appraisal of the situation is quite in contrast to the wild "viewing with alarm" that characterizes the type of crackpotism the public has been hearing so much about of late.

We hope that pesticide people on the local level will study carefully the points made by Mr. Miller and Dr. Scheele as noted above. These are good things to bear in mind when it becomes necessary to talk down anyone in the community who is "certain" that pesticides are at the root of all human ills.



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CROPLIFE is a controlled circulation journal published weekly. Weekly distribution of each issue is made to the fertilizer manufacturers, pesticide formulators and basic chemical manufacturers. In addition, the dealer-distributor-farm adviser segment of the agricultural chemical industry is covered on a regional (crop-area) basis with a mailing schedule which covers consecutively, one each week, four geographic regions (Northeast, South, Midwest and West) of the U.S. with one of four regional dealer issues. To those not eligible for this controlled distribution Croplife subscription rate is $5 for one year ($8 a year outside the U.S.). Single copy price, 25¢.

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WASHINGTON CORRESPONDENT — John Cipperly, 604 Hibbs Bldg., Washington, D. C. (Tel. Republic 7-8534).

EXECUTIVE AND EDITORIAL OFFICES — 2501 Wayzata Blvd., Minneapolis, Minn. Tel. Federal 2-0575. Bell System Teletype Service at Minneapolis (MP 179), Kansas City (KC 295), Chicago (CG 340), New York (NY 1-2452), Washington, D.C. (WA 82).

Published by
THE MILLER PUBLISHING CO.
2501 Wayzata Blvd., Minneapolis, Minn.
(Address Mail to P. O. Box 67, Minneapolis 1, Minn.)

Associated Publications—THE NORTHWESTERN MILLER. THE AMERICAN BAKER. FEEDSTUFFS. MILLING PRODUCTION

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ly 30-31—Fertilizer Meetings and Experiment Station Tours, Auburn, Ala. and Thorsby, Ala., Sponsored by the Alabama Agricultural Experiment Station and Alabama Soil Fertility Society.

ug. 13-14—Ohio Pesticide Institute, Summer Meeting, Ohio Agricultural Experiment Station, Wooster, Ohio, J. D. Wilson, Ohio Agricultural Experiment Station, Secretary.

ug. 28-31—Soil Conservation Society of America, Annual Convention, Asilomar, Cal.

ept. 4—Kentucky Fertilizer Conference, Campbell House, Lexington, Ky

ept. 4-6—National Agricultural Chemicals Assn., Annual Meeting Essex & Sussex, Spring Lake, N.J., L. S. Hitchner, 1145 19th St. N.W., Washington 6, D.C., Executive Secretary.

ept. 5-6—Great Lakes States Anhydrous Ammonia Meeting, Michigan State University, East Lansing, Mich.

ept. 8-15—International Congress of Crop Protection, Hamburg, Germany.

ept. 24-25—New England Fertilizer Conference, Bald Peak, Colony Club, Melvin Village, N.H.

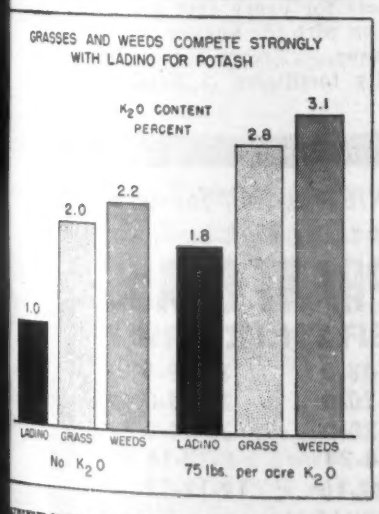
ct. 2-4—Eleventh Annual Beltwide Cotton Mechanization Conference, Shreveport, La.

ct. 3—New Jersey Fertilizer Conference, Rutgers University, New Brunswick, N.J.

ct. 3-5—Pacific Northwest Plant Food Assn., Annual Convention, Sun Valley, Idaho, Leon S. Jackson, Lewis Bldg., Portland 4, Ore., Secretary.

ct. 7-8—Western Agricultural Chemicals Assn., Fall Meeting, Villa Hotel, San Mateo, Cal., C. O. Barnard, 2466 Kenwood Ave., San Jose 28, Cal., Executive Secretary.

ct. 14—Sixth Annual Sales Clinic of the Salesmen's Assn., American Chemical Society, Hotel Roosevelt, New York.



EEDS ROB PASTURE—If the po-ash supply is too low, alfalfa and lovers will usually just disappear rom a field, and the grasses will take ver. Often this happens without uch evidence, such as obvious de-iency symptoms. Grasses and weeds re better able to take up potassium rom the soil and take it away from he legumes. This is illustrated in the raph above based on work in New ork. Many fertilizer tests with rass-legume mixtures on soils low in otassium have been conducted. The eas receiving potash continue to ave a good stand while the no-po-ash plots will be largely grass. Four ns of a legume or a legume-grass rage will remove as much potash as in 600 to 900 lb. of 0-10-20 ferti-zer. (American Potash Institute afa)

Oct. 15—Association of Official Agricultural Chemists, 71st Annual Meeting, Washington, D.C., Dr. William Horwitz, Box 540, Benjamin Franklin Station, Washington, D.C., secretary-treasurer.

Oct. 17—Conference on Chemical Control Procedures for Industry Chemical Control Analysts, Shoreham Hotel, Washington, D.C. Sponsored by National Plant Food Institute.

Oct. 18—Association of American Fertilizer Control Officials (States Relations Committee, 8 p.m. Oct. 17), Shoreham Hotel, Washington, D.C., B. D. Cloaninger, Box 392, Clemson, S.C., Secretary-Treasurer.

Oct. 29-30—Seventh Annual Northwest Garden Supply Trade Show of Oregon Feed & Seed Dealers Assn., Portland, Ore. Masonic Temple.

Oct. 29-31—Entomological Society of Canada and Entomological Society of Alberta, Annual Meetings, Lethbridge, Alberta.

Oct. 31-Nov. 1—Second Annual Southern Fertilizer Conference and Second Annual Southern Soil Fertility Conference, Dinkler Plaza Hotel, Atlanta, Ga.

Nov. 3-5—California Fertilizer Assn. 34th Annual Convention, St. Francis Hotel, San Francisco, Sidney H. Bierly, General Manager, 475 Huntington Drive, San Marino 9, Cal.

Nov. 6-8—Fertilizer Industry Round Table, Sheraton Park Hotel, Washington, D.C.

Nov. 17-19—National Fertilizer Solutions Assn., Annual Convention, Netherland-Hilton Hotel, Cincinnati, Muriel F. Collie, 2217 Tribune Tower, Chicago 11, Ill.

Dec. 1-3—Southern Seedsmen's Assn., Jung Hotel, New Orleans.

Dec. 2-5—Entomological Society of America, 5th Annual Meeting, Hotel Peabody, Memphis, Tenn., R. H. Nelson, 1530 P St., N.W., Washington 5, D.C., Executive Secretary.

Dec. 2-5—Cotton States Branch, Entomological Society of America, 32nd Annual Meeting, Hotel Peabody, Memphis, Tenn., M. E. Merkl, Box 202, Leland, Miss., Secretary-Treasurer.

Dec. 9-12—Chemical Specialties Manufacturers Assn., Hollywood Beach Hotel, Hollywood, Fla.

Dec. 10-12—North Central Weed Control Conference, 14th Annual Meeting, Hotel Savory, Des Moines, Iowa. Lyle A. Derscheid, agronomy department, South Dakota State College, Brookings, Program Chairman.

Dec. 11-13—Agricultural Ammonia Institute, Seventh Annual Meeting, Hotel Marion, Little Rock, Ark., Jack F. Criswell, Claridge Hotel, Memphis, Executive Vice President.

Dec. 12-13—Beltwide Cotton Production Conference, Hotel Peabody, Memphis, Tenn.

1958

Jan. 7-8—Texas Fertilizer Conference, Texas A&M, College Station, Texas.

Jan. 13-15, 1958—Weed Society of America and Southern Weed Conference, joint meeting, Peabody Hotel, Memphis, Tenn.

Jan. 21-23—California Weed Conference, San Jose, Cal.

Feb. 13-14—Agronomists-Industry Joint Meeting, Edgewater Beach Hotel, Chicago, sponsored by the Middle West Soil Improvement Committee, Z. H. Beers, 228 N. LaSalle St., Chicago 1, Ill., Executive Secretary.

March 4-5—Western Cotton Production Conference, Hotel Cortez, El Paso, Texas, Conference Sponsored by the National Cotton Council and the Five State Cotton Growers Assn.

June 15-18—National Plant Food Institute, Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 25-27—Pacific Branch, Entomological Society of America, San Diego, Cal.

July 18-19—Southwest Fertilizer Conference and Grade Hearing, Buccaneer Hotel, Galveston, Texas.

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MADRAS, ORE.—A new chapter in the Central Oregon potato industry's search for new markets and marketing methods will start this fall at the Jefferson Potato Co.'s Metolius plant now under construction. The plant, a 60 x 115 foot structure, will be a $50,000 addition to the firm's present warehouse and will hold machinery for processing potatoes into ready-to-cook French-fry-type slices and "whole peels." The latter are whole potatoes with the peels removed.

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Bemis Bro. Bag Co.
Blue, John, Co.
Bonneville, Ltd.
Bradley & Baker
Broyhill Company
Burkhardt Larsen Co.

Chase Bag Co. 21
Chemagro Corp.
Chemical & Industrial Corp.
Chemical Insecticides Corp. 14
Clover Chemical Co.
College Science Publishers
Commercial Solvents Corp.
Consolidated Mining & Smelting Co. 24

Davison Chemical Co.
Deere & Co., Grand River Chem. Div.
Dempster Mill Mfg Co.
Dow Chemical Co.
E. I. Du Pont de Nemours & Co., Inc.
Duval Sulphur & Potash Co. 17

Eastern States Chemical Corp.
Emulsol Chemical Corp.

Flexco Products, Inc. 2
Frontier Chemical Co.

Gates Rubber Co.
Grace Chemical Co. 6
Grand River Chemical Div. of Deere & Co.

Harshaw Chemical Co.
Hayes & Stolz
Hercules Powder Co.
Hough, Frank H., Co.
Hypro Engineering Co. 15

Industrial Fumigant Co.
International Minerals & Chemical Corp.

Johns-Manville Corp.

Kent, Percy, Bag Co.
Kraft Bag Corp.

Larvacide Products

Markley Laboratories 2
Merck & Co.
Meridith Pub. Co. 21
Miller Publishing Co., The
Minerals & Chemicals Corp.
Mississippi River Chemical Co.
Monsanto Chemical Co.

National Potash Co. 7
Naugatuck Chemical Div., U. S. Rubber Co.
Niagara Chemical Division, Food Machinery & Chemical Corp.
Nitroform Agricultural Chemicals, Inc.
Nitrogen Div., Allied Chemical & Dye Corporation
Northwest Nitro-Chemicals, Ltd.

Olin Mathieson Chemical Corp. 20

Pacific Coast Borax Co. 3
Penick, S. B., & Co.
Pennsalt of Washington Div. of Pennsalt Chemicals Corp. 11
Phillips Chemical Co. 8
Potash Company of America
Pringle, Ashmead F., Jr. 23
Private Brands, Inc.

Raymond Bag Co. 4
Riverdale Chemical Co.

Shell Chemical Corp.
Simonsen Mfg. Co. 2
Sinclair Chemicals, Inc.
Smith-Rowland Co., Inc.
Sohio Chemical Co. 5
Southern Nitrogen Co.
Spencer Chemical Co.
Spraying Systems Co.
Stewart-Warner Corp.
Successful Farming 21

Tennessee Corp.
Thomas Alabama Kaolin Co.

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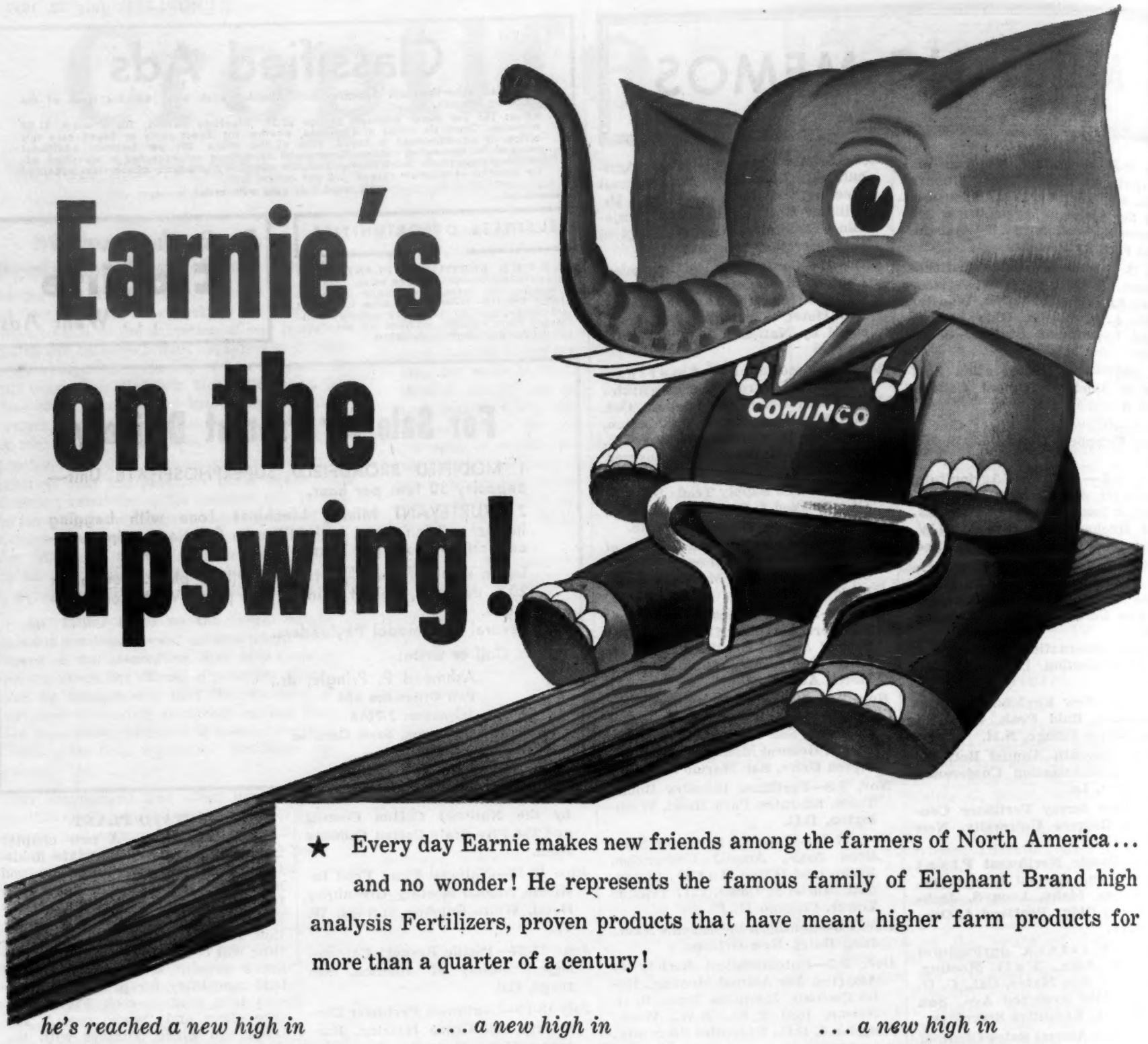

★ Every day Earnie makes new friends among the farmers of North America... and no wonder! He represents the famous family of Elephant Brand high analysis Fertilizers, proven products that have meant higher farm products for more than a quarter of a century!

he's reached a new high in

POPULARITY...

With grain, row crops, fruit and forage, American farmers have discovered that Elephant Brand fertilizer means bigger yields and profits many times their investments. This year, you and all the Elephant Brand dealers are going to sell **more** Elephant Brand than ever before!

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QUALITY.....

All the fertilizers in the Elephant Brand line are high analysis. They contain plenty of readily available, water soluble plant food—and their free-flowing pelleted form means speed, ease and economy of application—high quality—weather and tear resistant bags means easier handling too. These qualities are the keys to true fertilizer value... and they make Elephant Brand a preferred fertilizer investment!

... a new high in

SERVICE.....

With a new system of warehouses throughout our market area, we can supply you with your Elephant Brand fertilizer needs faster than ever before! Even in peak fertilizer sales periods, you can assure your customers of fast, dependable delivery!

... backed by a new high in

ADVERTISING..

With farm journal advertisements, radio, billboards, dealer aids and, in some areas, television, Earnie will remind farmers of Elephant Brand benefits. This year, your sales effort will be backed by the biggest advertising campaign in Elephant Brand history!

... a new high in

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Now you can offer your customers a choice of 13 Elephant Brand high analysis fertilizers... proven products for every crop and soil! You can supply them with the answer to every plant food requirement... from one of the largest lines of quality fertilizers in North America!

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16-20-0	23-23-0
24-20-0	27-14-0
6-24-24	8-32-16
10-32-10	12-12-12

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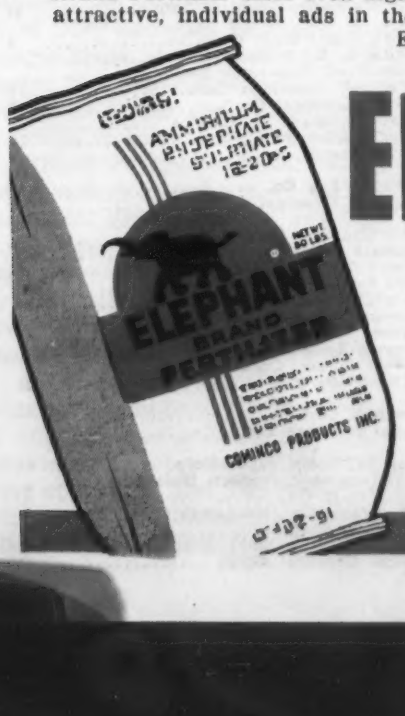

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